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Thirty-day Field Tests of Industrial Boilers Site 2 - Residual-oil-fired Boiler

KVB, Inc.
Irvine, CA

Prepared for

Industrial Environmental Research Lab.
Research Triangle Park, NC

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Boilers	Hydrocarbons	Stationary Sources	13A	07C
Residual Oils	Dust	Industrial Boilers	21D	11G
Combustion		Combustion Modification	21B	
Field Tests		Staged Combustion	14B	
Sulfur Oxides		Low Excess Air	07B	
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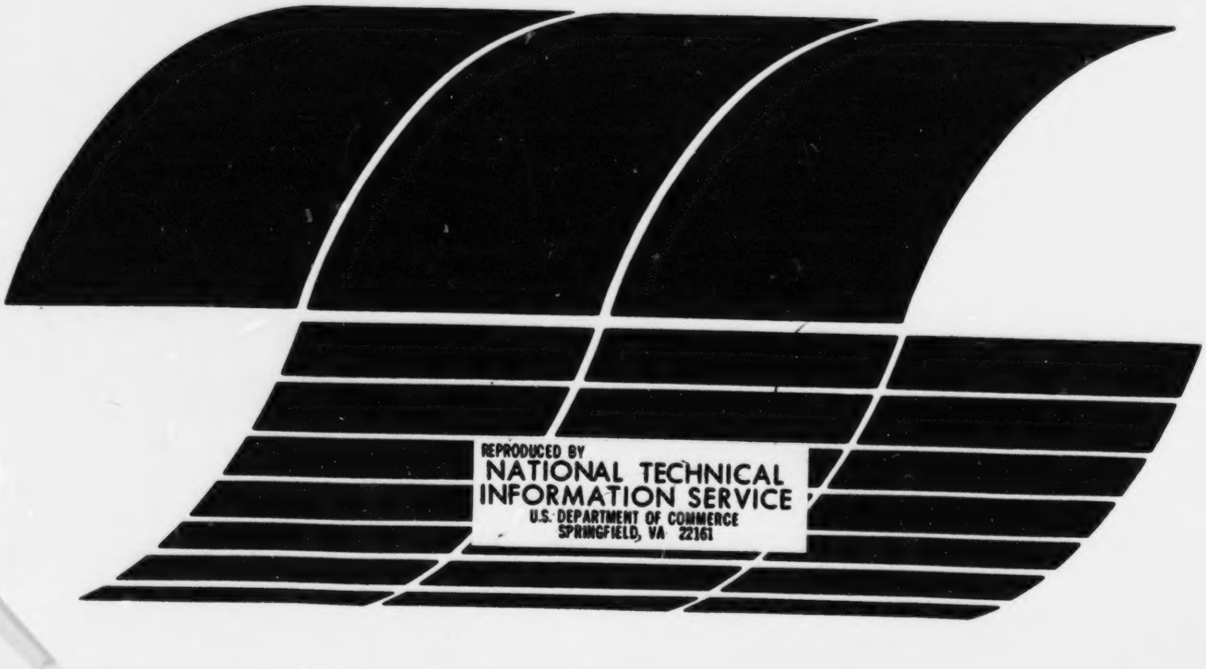
Interagency Energy/Environment R&D Program Report



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April 1980

Thirty-day Field Tests of Industrial Boilers: Site 2 — Residual-oil-fired Boiler

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Task No. 4
Program Element No. EHE624

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Prepared for

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ABSTRACT

This is a final report on a test program to evaluate the long term effectiveness of combustion modifications on industrial boilers. During previous programs short term tests have been performed on industrial boilers to determine the effect of combustion modifications on air pollutant emissions such as NO_x, SO_x, CO, HC, and particulate. The objective of this program was to determine whether the combustion modification techniques which were effective for short duration tests are feasible for a longer period. This report presents results of a 30-day field test of a 26.4 MW output (90,000 lb steam/hr) residual-oil-fired boiler. The NO_x control technology employed on this unit was staged combustion air. The as found concentration of NO_x was 130 ng/J (235 ppm at 3% O_2, dry). Firing in the low NO_x mode, with staged combustion air, resulted in a reduction in NO_x emission of approximately 23 percent to 100 ng/J (181 ppm at 3% O_2, dry).

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SECTION 1.0

SUMMARY

1.1 OBJECTIVE AND SCOPE

The objective of this field test was to determine whether combustion modification techniques which demonstrated reductions in air pollutant emissions during short-term tests are feasible for longer periods. In addition, boiler performance and reliability were monitored. The combustion modifications have previously been shown to be effective on industrial boilers. (Reference 1 and 2).

The program scope provided for thirty-day field tests of a total of seven industrial boilers with design capacities ranging from 14.65 to 73.25 MW output (50,000 to 250,000 lb steam/hr). This final report is for the second of the seven, a 26.4 MW output (90,000 lb steam/hr) residual-oil-fired boiler using staged combustion air and low excess air as the NO_x emission control technology.

During the test period, continuous-monitor certification tests were performed concurrently with low NO_x testing. Emissions measured were particulate, NO, CO_2, CO, and O_2. Boiler efficiency was measured several times during the program to determine the effect of combustion modification on boiler efficiency.

This is a final report on the thirty-day test documenting the test equipment, a summary of the test data, and a discussion of the data in relation to the control technology employed for this type of boiler.

1.2 RESULTS

The initial task of this program was to select industrial boiler test sites which fit the categories set forth in the statement of work. Further, it was desired to find a site which had previously been tested to minimize the setup time and eliminate the need for extensive combustion modification testing. A survey of previous test sites was made to locate a residual-oil-fired boiler which employed staged combustion air and low excess air as the NO_x control technologies. Boilers which were tested by KVB under previous programs (cited in the document footnoted on the previous page) were reviewed. The boiler which best met the above criteria was selected for testing.

Following test site selection, the KVB continuous monitor was shipped to the site and installed. Continuous-monitor certification tests, as outlined in Performance Specifications 2 and 3, 40 CFR 60, Appendix B, were then begun.

The 30-day field test was begun after the continuous monitor certification tests were completed. The test was performed according to "Plan for Performing Source Evaluation Tests in Support of the NSPS for Industrial Boilers." Emissions of NO, CO, CO_2 and O_2 were measured continuously. Particulate measurements were made in triplicate at the start, midpoint and conclusion of the test period. Triplicate particulate measurements were also made with the boiler in the as-found condition. Measurements of polycyclic organic matter were made in both the modified and as-found conditions.

The results of the 30-day test are discussed in detail in Section 3.0.

Table 1-1 is a summary of the 24-hour averages of gaseous emissions compiled from the analyzer strip chart recordings and plant steam flow charts. An analysis of the field test data was prepared. A log-probability plot of 24-hour averages is presented in Figure 1-1 for the low NO_x condition. The mean value for the NO is 100 ng/J with a geometric dispersion of 1.12.

TABLE 1-1. SUMMARY OF 24-HOUR AVERAGE GASEOUS EMISSIONS

SITE 2

24 HOUR DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
3/14/79		15.2	8.7	8.7	181.	266.	147.
3/15/79		16.0	9.0	9.2	183.	274.	151.
3/16/79		15.4	8.5	10.9	163.	236.	130.
3/17/79		15.3	8.1	11.9	157.	220.	121.
3/18/79		18.1	8.1	10.5	196.	273.	151.
3/19/79		16.5	7.7	11.4	162.	219.	121.
3/20/79		16.7	7.6	12.6	152.	204.	112.
3/21/79		16.6	7.5	11.4	132.	175.	97.
3/22/79		16.5	7.6	10.1	121.	163.	90.
3/23/79		16.5	7.6	10.1	119.	160.	88.
3/24/79		16.4	7.9	9.8	132.	182.	100.
3/25/79		16.3	8.5	9.6	135.	195.	107.
3/26/79		16.4	8.0	9.9	132.	183.	101.
3/27/79		16.6	7.8	10.4	111.	151.	83.
3/28/79		16.6	7.9	10.4	119.	164.	90.
3/29/79		11.2	10.5	8.4	0.	0.	0.
3/30/79		12.9	10.5	7.9	125.	216.	119.
3/31/79		13.9	10.1	8.3	133.	220.	121.
4/ 1/79		13.6	10.8	7.7	121.	214.	118.
4/ 2/79		15.7	9.2	8.9	127.	196.	108.
4/ 3/79		16.1	8.1	9.9	117.	163.	90.
4/ 4/79		16.0	8.3	10.1	123.	176.	97.
4/ 5/79		16.3	7.3	10.1	126.	165.	91.
4/ 6/79		16.8	7.1	10.1	123.	160.	88.
4/ 7/79		17.2	6.8	10.4	153.	194.	107.
4/ 8/79		20.6	6.7	10.5	163.	205.	113.
4/ 9/79		20.7	6.3	10.6	187.	229.	126.
4/10/79		17.8	6.8	10.5	181.	230.	127.
4/11/79		13.9	10.1	8.2	132.	218.	120.
4/12/79		17.3	8.1	9.6	165.	231.	127.
4/13/79		19.2	8.8	9.3	158.	234.	129.
4/14/79		18.5	6.7	10.1	181.	229.	126.
4/15/79		18.9	7.2	10.0	166.	218.	120.
4/16/79		19.5	7.4	10.1	173.	230.	127.
4/17/79		17.0	7.7	10.0	161.	218.	120.
4/18/79		16.8	7.9	9.9	137.	190.	105.
4/19/79		16.7	9.2	9.7	121.	184.	101.

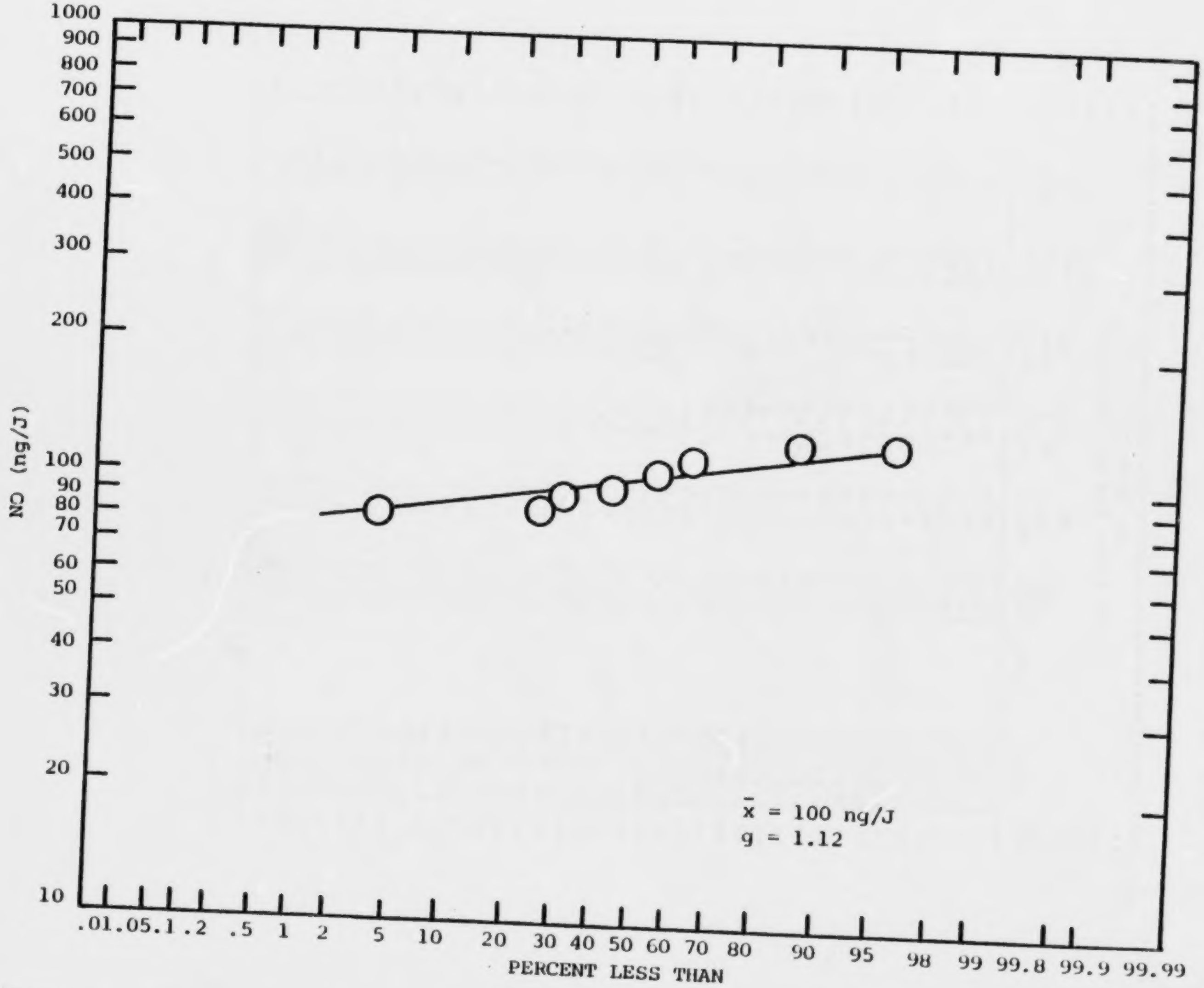

Figure 1-1. Site 2 - Residual Oil Fired Boiler-Staged Combustion Air (BOOS)

1.3 CONCLUSIONS

Based on the results of this 30-day field test, several important conclusions can be drawn.

1. Staged combustion air (SCA) is an effective NO_x control technology for residual-oil-fired boilers. Staged combustion air was achieved by removing one burner from service in a triangular burner pattern. Removing one burner from service resulted in an NO emission level of 100 ng/J (178 ppm at 3 percent O_2, dry). This level represents a reduction of approximately 23 percent from the condition where all burners are firing. All burners firing produce NO emissions of 130 ng/J (232 ppm at 3 percent O_2 dry). It was not possible to operate the entire test with one burner out of service due to steam demand. As a result, the average NO emission level for the 30-day test was 110 ng/J (196 ppm at 3 percent O_2, dry).

2. Operation of the boiler in the low NO_x mode resulted in 48 percent higher particulate emissions than did normal operation. The particulate emission level with all burners firing was 25.6 ng/J (0.0594 lb/10^6 Btu), while the low NO_x mode with one burner out of service resulted in 37.8 ng/J (0.0878 lb/10^6 Btu).

3. Boiler operation with one burner out of service results in reduced capacity for the boiler due to oil supply pressure limitations. In order to operate at full capacity with two burners, new oil tips would be required. These were not available for this test.

4. The continuous-monitor system utilizing an extractive sample system provided accurate, reliable data. The NO analyzer was out of service for two days during the duration of the test. The CO analyzer was out of service 23 days during the same period.

5. POM measurements showed a slight decrease when operating in the low NO_x mode. Total POM in the baseline condition were 7.6 <11.36 $\mu g/m^3$ and 4.6 <9.7 $\mu g/m^3$ in the low NO_x mode.

SECTION 2.0

INSTRUMENTATION AND PROCEDURES

This section presents a description of the instrumentation used to measure the gaseous and particulate emissions, the test procedures, the techniques for certifying the continuous monitor, and a description of the boiler tested.

2.1 EMISSIONS MEASUREMENT INSTRUMENTATION

The emissions measurements were made using a continuous monitor fabricated by KVB for this program. The analytical instrumentation and sample handling equipment are contained in a cabinet 1.2 m wide x 0.76 m deep x 183 m high (48"W x 30"D x 72"H). A photograph of the continuous monitor is shown in Figure 2-1. Gaseous emission measurements were made with the analytical instruments listed in Table 2-1.

Total particulate measurements were made using an EPA Method 5 sampling train manufactured by Western Precipitation Division of Joy Manufacturing Company. Samples for measurement of polycyclic organic matter (POM) were obtained using an XAD-2 module supplied by Battelle Columbus Laboratories. These modules were returned to Battelle for analysis following the test.

2.1.1 Gaseous Emissions

The continuous monitor is equipped with analytical instruments to measure concentrations of NO, CO, CO_2, and O_2. The sample gas is delivered to the analyzers at the proper condition and flow rate through the sampling

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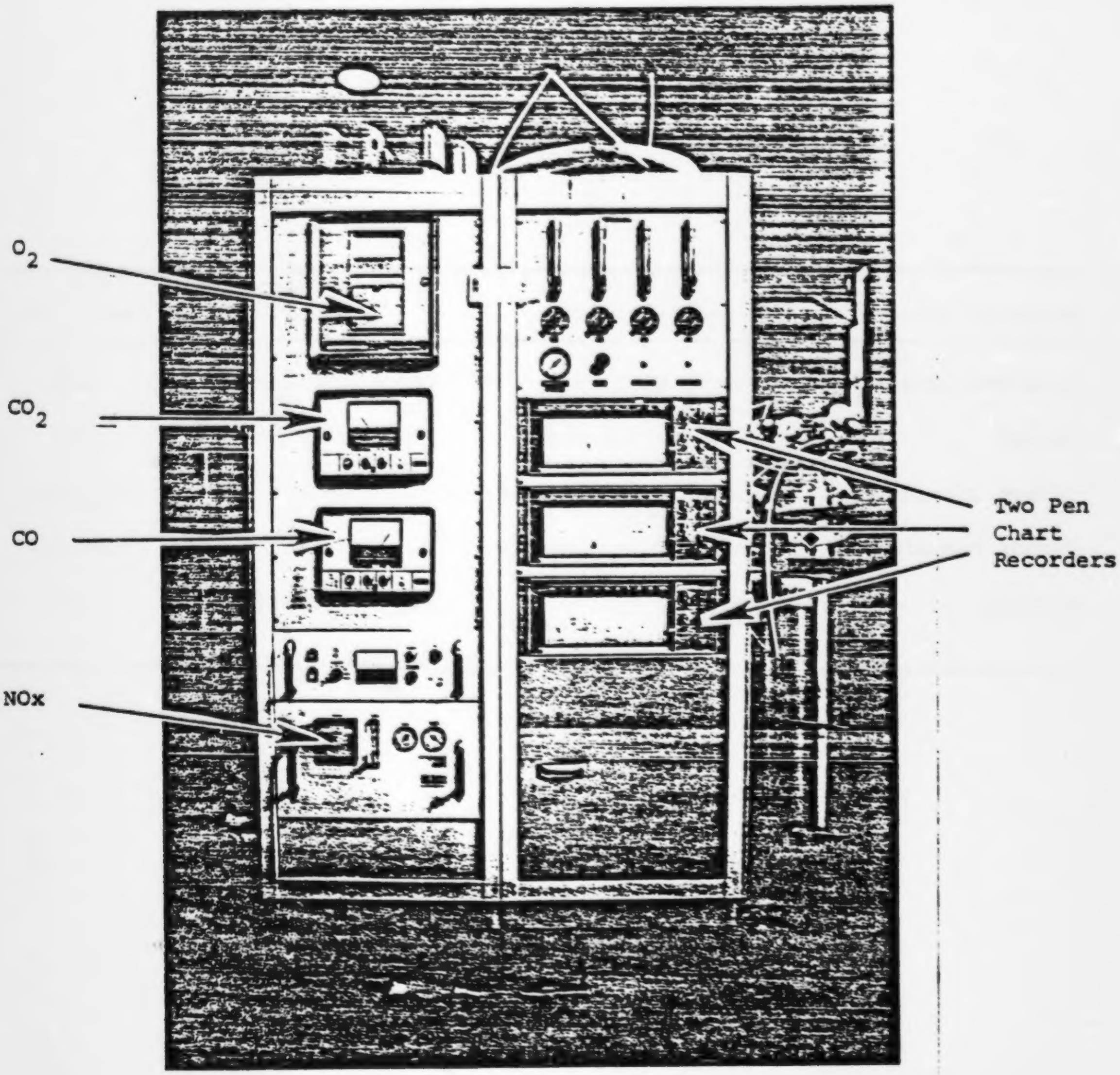


Figure 2-1. Photograph of KVB Continuous Monitor for Measuring Gaseous Emissions

TABLE 2-1. ANALYTICAL INSTRUMENTATION

Emission Species	Manufacturer	Measurement Method	Model No.
Nitrogen Oxides	Thermo Electron	Chemiluminescent	10A
Oxygen	Beckman Instrument	Polarographic	742
Carbon Dioxide	Horiba Instrument	NDIR	PIR-2000
Carbon Monoxide	Horiba Instrument	NDIR	PIR-2000
Opacity	Dynatron	Transmissometer	1100

and conditioning system shown schematically in Figure 2-2. A probe with a 0.7-micrometer sintered stainless steel filter was installed in the stack to sample the flue gas. The following paragraphs describe the analytical instrumentation.

A. Nitrogen Oxides--

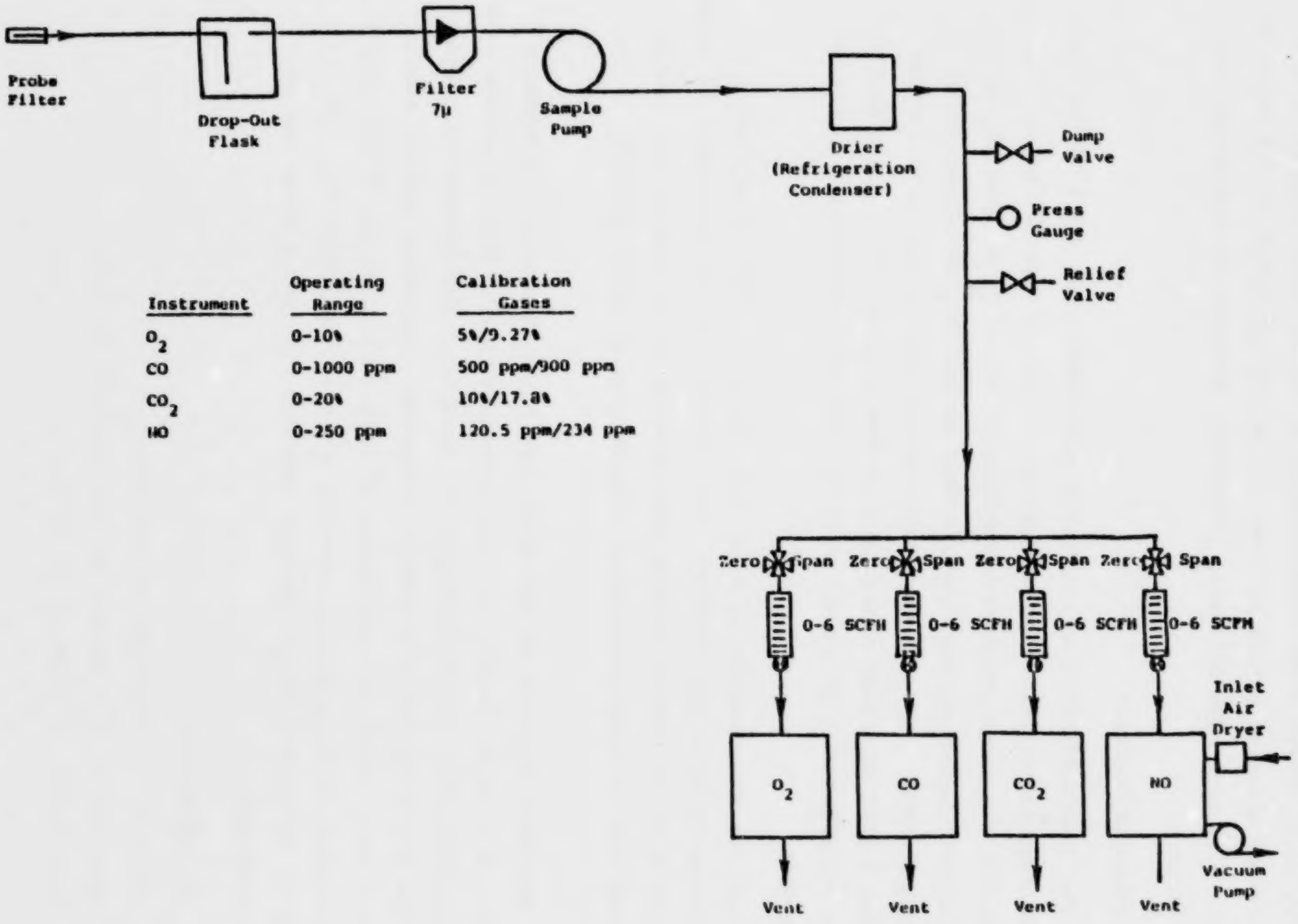
The oxides of nitrogen monitoring instrument used was a Thermo Electron chemiluminescent nitric oxide analyzer. The operational basis of the instrument is the chemiluminescent reaction of NO and O_3 to form NO_2 in an excited state. Light emission results when excited NO_2 molecules revert to their ground state. The resulting chemiluminescence is monitored through an optical filter by a high sensitivity photomultiplier tube, the output of which is electronically processed so it is linearly proportional to the NO concentration.

Air for the ozonator is drawn from ambient through an air dryer and a 10-micrometer filter element. Flow control for the instrument is accomplished by means of a small bellows pump mounted on the vent of the instrument downstream of a separator which insures that no water collects in the pump.

The basic analyzer is sensitive only to NO molecules. To measure NO_x (i.e., NO + NO_2), the NO_2 is first converted to NO. This is accomplished by a converter which is included with the analyzer. The conversion occurs as the gas passes through a thermally insulated, resistance heated, stainless steel coil. With the application of heat, NO_2 molecules in the sample gas are reduced to NO molecules, and the analyzer then reads NO_x. NO_2 is obtained by the difference in readings obtained with and without the converter in operation.

Specifications

Accuracy: 1 percent of full scale
Span drift: ± 1 percent of full scale in 24 hours
Zero drift: ± 1 ppm in 24 hours



Instrument	Operating Range	Calibration Gases
O_2	0-10%	5%/9.27%
CO	0-1000 ppm	500 ppm/900 ppm
CO_2	0-20%	10%/17.8%
NO	0-250 ppm	120.5 ppm/234 ppm

Figure 2-2. Schematic of continuous monitor sampling and conditioning system.

Power requirements: 115 ± 10V, 60 Hz, 1000 watts

Response: 90 percent of F.S. in 1 sec (NO_x mode); 0.7 sec (NO mode)

Output: 4 to 20 ma

Sensitivity: 0.5 ppm

Linearity: ± 1 percent of full scale

Vacuum detector operation

Range: 2.5, 10 25, 100, 250, 1000, 2500, 10,000 ppm F.S.

Only the NO concentration was measured during this program. Because of the added complexity of heated sample lines and controllers necessary for measuring NO_2 and the small percentage of NO_2 in the flue gas, based on previous tests (Reference 1, 2 and 3) EPA decided that only NO measurement was necessary. Therefore, an unheated sample line was installed and the moisture was removed from the sample gas by a dropout flask and a refrigerated condenser.

B. Carbon Monoxide and Carbon Dioxide--

Carbon monoxide (CO) and carbon dioxide (CO_2) concentrations were measured by Horiba Instruments PIR-2000 short-path-length nondispersive infrared analyzers. These instruments measure the differential in infrared energy absorbed from energy beams passed through a reference cell (containing a gas selected to have minimal absorption of infrared energy in the wave length absorbed by the gas component of interest) and a sample cell through which the sample gas flows continuously. The differential absorption appears as a reading on a scale of zero to 100 percent and is then related to the concentration of the species of interest by calibration curves supplied with the instrument. A linearizer was supplied with the CO analyzer to provide a linear output over the range of interest. The operating ranges for the CO analyzer are zero to 500, zero to 1000, and zero to 2000 ppm, and the ranges for the CO_2 analyzer are zero to 5, zero to 10, and zero to 20 percent.

Specifications

Accuracy: 1 percent of full scale

Repeatability: ± 0.5 percent of full scale

Zero drift: ± 1 percent of full scale in 24 hours

Span drift: ± 1 percent of full scale in 24 hours

Response time selectable: 90 percent of full scale in 0.5, 1.2, 3, or 5 seconds

Power requirements: 115 VAC ± 10 percent, 60 Hz

Warmup time: 30 minutes

Output: 0-10 MV

C. Oxygen--

A Beckman Model 742 oxygen analyzer was used to continuously determine the oxygen content of the flue gas sample. The oxygen measuring element contains a silver anode and gold cathode that are protected from the sample by a thin membrane of Teflon. An aqueous KCl solution is retained in the sensor by the membrane and serves as an electrolytic agent. As Teflon is permeable to gases, oxygen will diffuse from the sample to the cathode in the following oxidation-reduction reaction:

Cathode reaction: $O_2 + 2H_2O + 4e \rightarrow 4OH$

Anode reaction: $4Ag + 4Cl \rightarrow 4AgCl + 4e$

With an applied potential between the cathode and anode, oxygen will be reduced at the cathode, causing a current to flow. The magnitude of this current is proportional to the partial pressure of oxygen present in the sample. The instrument has operating ranges of zero to 1 percent, zero to 10 percent, and zero to 25 percent oxygen.

Specifications

Accuracy: ± 1 percent of full scale or ± 0.05 percent O_2, whichever is greater

Sensor stability: ± 1 percent of full scale per 24 hours

Response time: 90 percent in 20 seconds

Output: 0 to 10 MV

Power requirement: 120 ± 10 VAC, 60 Hz

2.1.2 Particulate Emissions

Particulate samples were taken from ports on the vertical side of the rectangular duct at the boiler outlet. The boiler had no port. Four ports were located 0.28 m (11 inches) apart up the side of the duct. The samples were taken using a Joy Manufacturing Company portable effluent sampler. This system, which meets the EPA design specifications for Test Method 5 (Determination of Particulate Emissions from Stationary Sources, Federal Register, Volume 42, No. 160, page 41754, August 18, 1977), is used to perform both the initial velocity traverse and the particulate sample collection. Dry particulates are collected in a heated case that contains, first, a cyclone to separate particles larger than 5 microns and, second, a 100-mm glass-fiber filter for retention of particles as small as 0.3 micrometer. Condensible particulates are collected in a train of four Greenburg-Smith impingers in a chilled water bath.

2.1.3 Polycyclic Organic Matter (POM) Emissions

Particulate and gaseous samples for analysis of POM were taken at the sample port used for Method 5 particulate tests. The sampling system is a modified Method 5 sampling train developed by Battelle Columbus Laboratories. A combination of conventional filtration with collection of organic vapors by means of a high-surface-area polymeric adsorbent (XAD-2) has proved to be highly efficient for collection of all but the more volatile organic species. The modified sampling system consists of the standard EPA train with the adsorbent sampler (Figure 2-3) located between the filter and the impingers. With this system, filterable particulate can be determined from the filter catch and the probe wash according to Method 5; the organic materials present can be determined from the analysis of the filterable particulate and the adsorbent sampler catch. The impingers are only used to cool the stream and protect the dry-gas meter, and their contents are discarded.

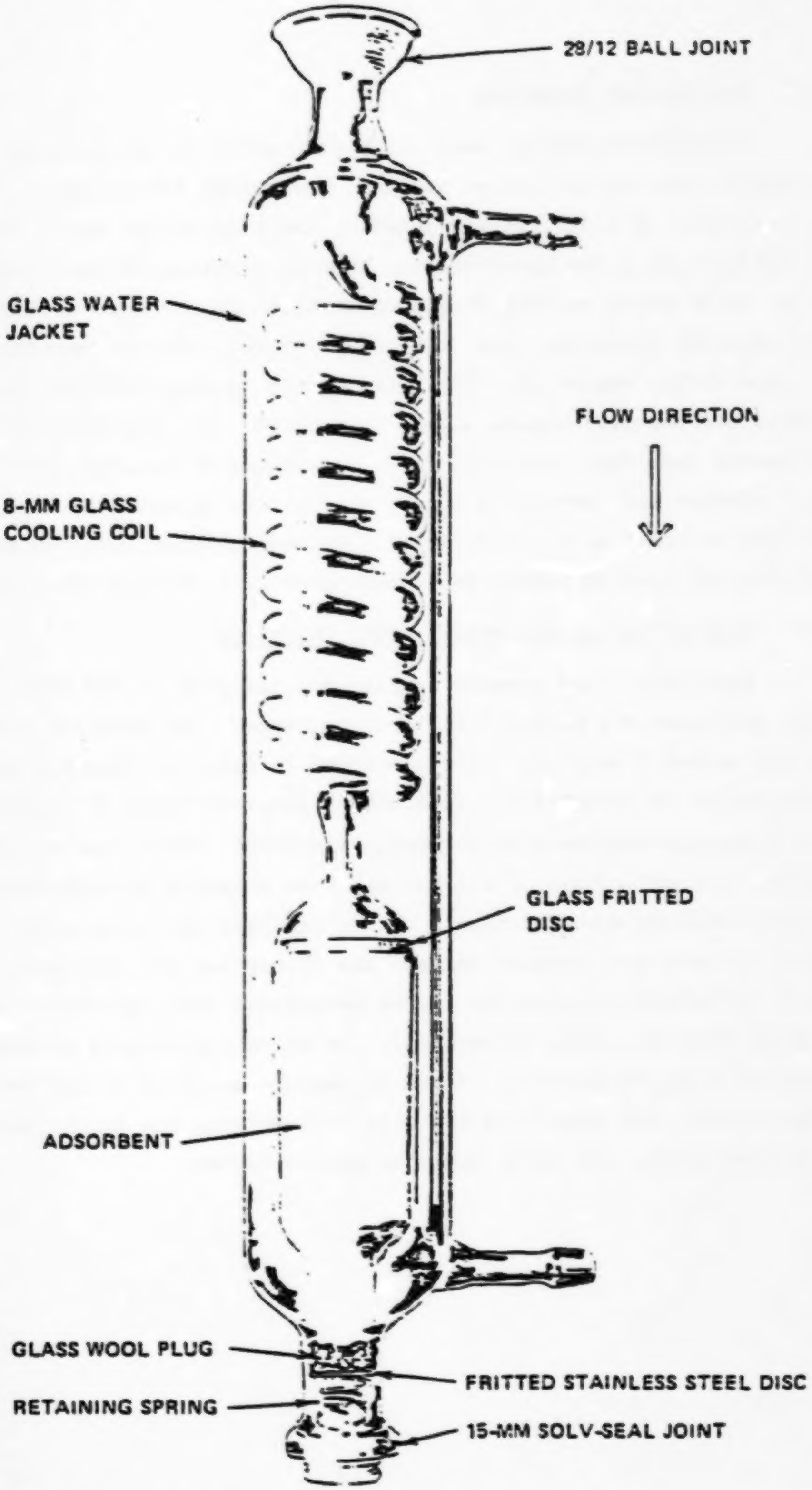


Figure 2-3. Mark III adsorbent sampling system.

2.1.4 Opacity Measurement

Stack opacity was measured with a Dynatron Model 1100 Opacity Monitoring System. The Model 1100 opacity monitor is a double pass transmissometer which measures the light transmittance through a flue gas. The transceiver unit contains the light source, the detector, and electronic circuitry. A reflector is mounted in the end of a slotted probe which is attached to the transceiver and is inserted into a stack or duct through a conventional stack sampling port. The probe causes negligible flow disturbance, and an air purge keeps the optical window and reflector clean. The transceiver output is transmitted to a portable control unit which displays either opacity or optical density automatically correlated from differences between the path length of the transmissometer and the mean diameter of the stack outlet.

Specifications

Peak spectral response: 500 to 600 nm
Mean spectral response: 500 to 600 nm
Relative response: < 10 percent
Angle of view: < 4 degrees
Angle of projection: < 2 degrees
Calibration error: < 2 percent
Response time: 1 second
Zero drift: < 1 percent (24 hours)
Calibration drift: < 1 percent (24 hours)
Operational test period: 168 hours
Output: 0 to 1 VDC
Power requirements: 115 VAC/60Hz
Temperature range: 40°F to 125°F
Weight: 27 pounds (approximate)

The transceiver lenses are cleaned daily, and an air purge is used to keep the lenses free of dirt while inserted in the stack.

2.2 BOILER DESCRIPTION AND CHARACTERISTICS

The boiler at Site 2 was manufactured by Babcock and Wilcox in 1935. It is an integral furnace watertube boiler with an original rated capacity of 26.4 MW (90,000 lb steam/hr). The current top load capability of 79,000 lb steam/hr is limited by the fan. The furnace wall consists of watertubes 76 mm (3 inches) in diameter spaced 260 mm (10.25 inches) on centers. The wall exposure between the tubes consists of refractory; the furnace was rebricked in 1972. The boiler operates at a nominal steam pressure of 2.2 MPa (320 psig) and a steam temperature of 493K (428°F).

The boiler is fired with three B&W steam-atomized burners arranged in a triangular pattern with the top burner spaced directly above the center of the lower two burners. The vertical spacing is 0.91 m (36 inches); the horizontal spacing is 0.94 m (37 inches). The oil guns use a B&W Y-jet steam atomizer with the steam pressure at the burner nominally 0.24 MPa (35 psi) greater than the oil pressure. The boiler fires No. 6 oil, and the temperature of the oil at the burner was approximately 367K (200°F). The nominal oil pressure at top load was 0.58 MPa (85 psi). The boiler is outfitted with a tubular air heater to preheat the combustion air.

The test boiler was situated in the main power plant of a chemical process plant and was one of four boilers used for supplying process steam. The NO_x control technology employed at this test site was staged combustion air, which was shown previously to be effective for reducing NO_x emissions from this boiler. Staged combustion was achieved by removing the upper burner (#1) from service. This does not upset the symmetry of the furnace because of the triangular arrangement of the burners. By terminating the fuel flow to the #1 burner and leaving the air register 100 percent open, the excess air to the active burners was reduced to two-thirds of its original value with all burners in service, because the remaining one-third of the air was injected through the out-of-service burner port. When firing with one burner out of service, the maximum steam flow possible was 17.6 MW thermal output (60,000 lb/hr). The load was restricted to this value by fuel pressure. A maximum fuel pressure of 0.689 MPa (100 psi) was available which, coupled with the oil gun orifices, limited the fuel flow.

2.3 DAILY TEST ACTIVITY

This section describes the daily test activity at Site 2 following the monitor certification tests. The schedule of monitor certification test events is presented in Section 3-1. A schedule of daily events is presented in Table 2-2.

The data from the gaseous analyzers (NO, CO, CO_2, and O_2) were continuously recorded on strip chart recorders. Gaseous data were read five times daily and recorded on the form shown in Figure B-6, Appendix B. These data were subsequently used for verification of the data reduced from the strip charts for analysis. Boiler operating data were recorded periodically by KVB personnel. Daily charts of steam flow for the entire test period were provided by the boiler operators. The strip chart recorders recorded gaseous emissions 24 hours per day, 7 days per week. No control room data were recorded on weekends; however, the technician did calibrate the instruments on the weekend.

Daily tasks consisted of (1) instrument calibration and recording of control room and emissions data; (2) consultation with boiler operators regarding boiler operation in the low NO_x mode; (3) periodic maintenance of instruments and sample system; (4) visual inspection and troubleshooting of the sampling system and instrumentation console; and (5) procuring supplies and equipment for the particulate and Method 7 tests.

TABLE 2-2. SCHEDULE OF DAILY EVENTS - SITE 2

Time	Event
0800	Calibrate (zero and span) gaseous analyzers (NO, CO_2, CO, and O_2). Record gaseous emissions data. Record boiler control room data. Consult with operators concerning boiler operation.
0845	Calibrate opacity monitor.
0900	Perform daily systems checkout.
1000	Calibrate and record gaseous emissions data.
1200	Calibrate and record gaseous emissions data. Record control room data.
1400	Calibrate and record gaseous emissions data.
1600	Calibrate and record gaseous emissions data. Record control room data.
1700	Calibrate analyzers prior to departing plant. Perform visual check of sampling systems and boiler operation. Leave instructions with operators.

SECTION 3.0

TEST RESULTS

This section summarizes the emission and efficiency data collected on the residual-oil-fired boiler. The NO_x control technology employed on this boiler was staged combustion air. The boiler was tested in the as-found condition initially and in the low NO_x mode for 32 days. The boiler fires No. 6 fuel oil. The results presented herein summarize the gaseous and particulate emissions data, efficiency, and present conclusions for the boiler operating under low NO_x conditions for extended duration.

3.1 CONTINUOUS-MONITOR CERTIFICATION TESTS

The continuous monitor described in the previous section was used to measure the boiler gaseous emissions. Following shipment to the test site, the monitoring system was installed and certification tests performed in accordance with Performance Specifications 2 (PS2) and 3 (PS3), 40 CFR 60, Appendix B (reproduced here as Appendix D). This appendix establishes minimum performance specifications that the NO monitoring system must meet in terms of eight parameters: accuracy, calibration error, 2- and 24-hour zero drifts, 2- and 24-hour calibration drifts, response time, and operational period.

The continuous-monitor system was installed and instruments were initially calibrated on March 13, 1979. The following day the monitor performance certification began. A daily event schedule for the certification tests is presented in Table 3-1.

The performance of the continuous monitor is summarized in Table 3-2. Also shown in the table are the monitor specifications extracted from PS2 and PS3. Included in this table is the performance of the CO analyzers which is

TABLE 3-1. SCHEDULE OF CERTIFICATION TEST EVENTS

Date	Time	Event
3/14/79	1000	Initial 24-hour zero and span reading.
3/15/79	1000	Initial 2-hour zero and span reading.
3/15/79	1200	1st 2-hour zero and span drift point.
3/15/79	1400	2nd 2-hour zero and span drift point.
3/15/79	1600	3rd 2-hour zero and span drift point.
3/15/79	1800	4th 2-hour zero and span drift point.
3/15/79	2000	5th 2-hour zero and span drift point.
3/15/79	1000	1st 24-hour zero and calibration drift point. Initial 2-hour zero and calibration reading - 2nd day.
3/16/79	1200	6th 2-hour zero and span drift point.
3/16/79	1400	7th 2-hour zero and span drift point.
3/16/79	1600	8th 2-hour zero and span drift point.
3/16/79	1800	9th 2-hour zero and span drift point.
3/16/79	1000	2nd 24-hour zero and calibration drift point.
3/17/79	1000	3rd 24-hour zero and calibration drift point.
3/18/79	1000	4th 24-hour zero and calibration drift point.
3/19/79	1000	5th 24-hour zero and calibration drift point.
3/19/79	1050	1st set of relative accuracy samples taken.
3/19/79	1150	2nd set of relative accuracy samples taken.
3/19/79	1200	10th 2-hour zero and span drift point.
3/19/79	1250	3rd set of relative accuracy samples taken.
3/19/79	1355	4th set of relative accuracy samples taken.
3/19/79	1400	11th 2-hour zero and span drift point.
3/19/79	1455	5th set of relative accuracy samples taken.
3/19/79	1555	6th set of relative accuracy samples taken.
3/19/79	1600	12th 2-hour zero and span drift point.
3/19/79	1655	7th set of relative accuracy samples taken.
3/19/79	1755	8th set of relative accuracy samples taken.
3/19/79	1800	13th 2-hour zero and span drift point.
3/19/79	1855	9th set of relative accuracy samples taken.
3/20/79	1000	6th 24-hour zero and calibration drift point.
3/20/79	1100	Instrument response time tests.
3/20/79	1200	14th 2-hour zero and span drift point.
3/20/79	1400	15th 2-hour zero and span drift point.
3/20/79	1500	Calibration error determination.
3/21/79	1000	7th and final 24-hour zero and calibration drift point.
4/19/79	4930	Relative accuracy samples taken, 3/19 series duplicated.

TABLE 3-2. INSTRUMENT SPECIFICATIONS AND PERFORMANCE

Parameter		Specifications*	Performance
A. Thermo Electron Series 10 NOx Analyzer			
1. Accuracy		≤ 20% of mean ref. value	8.72%
2. Calibration error	mid	≤ 5% cal gas value	4.30%
	high	≤ 5% of cal gas value	3.40%
3. Zero drift (2-hour)		2% of span	0.88%
4. Zero drift (24-hour)		2% of span	1.68%
5. Calibration drift (2-hour)		2% of span	1.68%
6. Calibration drift (24-hour)		2.5% of span	1.08%
7. Response time		15-minute maximum	5.5 sec.
8. Operational period		168-hour minimum	
B. Horiba Instruments PIR 2000 CO_2 Analyzer			
1. Zero drift (2-hour)		≤ 0.4 pct CO_2	0 %
2. Zero drift (24-hour)		≤ 0.5 pct CO_2	0.04%
3. Calibration drift (2-hour)		≤ 0.4 pct CO_2	0.13%
4. Calibration drift (24-hour)		≤ 0.5 pct CO_2	0.34%
5. Response time		10 minutes	4.2 sec.
6. Operational period		168-hour minimum	
C. Beckman Instruments Model 742 O_2 Analyzer			
1. Zero drift (2-hour)**		≤ 0.4 pct O_2	DNA
2. Zero drift (24-hour)**		≤ 0.5 pct O_2	DNA
3. Calibration drift (2-hour)		≤ 0.4 pct O_2	0.09
4. Calibration drift (24-hour)		≤ 0.5 pct O_2	0.25%
5. Response time		10 minutes	10.1 sec.
6. Operational period		168-hour minimum	
D. Horiba Instruments PIR 2000 CO Analyzer			
1. Calibration error	mid	≤ 5% of cal gas value	4.8%
	high	≤ 5% of cal gas value	1.4%
2. Zero drift (2-hour)		2% of span	0.12%
3. Zero drift (24-hour)		2% of span	0.23%
4. Calibration drift (2-hour)		2% of span	0.17%
5. Calibration drift (24-hour)		2.5% of span	0.39%
6. Response time		15-minute maximum	8.5 sec.
7. Operational period		168-hour minimum	

*Performance specifications from 40 CFR 60, Appendix B, reproduced here as Appendix D.

**Instrument has no zero adjustment.

not covered by the performance specification. The CO analyzer is used to monitor the combustion conditions in the boiler since it is a very sensitive indicator of combustion performance. Tables C-1 through C-18, Appendix C, show the performance of each of the analyzers for the certification tests.

The data presented in Table 3-2 show analyzers in the continuous monitor bettered the performance specification values for each parameter for each instrument.

Certified calibration gases were obtained from Scott Environmental Technology Inc. The calibration gases included 50 percent and 90 percent span gases for the NO, CO_2, CO, and O_2 analyzers, and a zero gas. In addition to the certified analysis supplied by the vendor, sample flasks were taken for each calibration gas and sent to an independent laboratory for analysis.

Relative accuracy tests for the NO analyzer were performed as outlined in PS2 using EPA Reference Method 7 (phenoldisulfonic acid [PDS] colorimetric) as the standard. Nine sets of three PDS flasks were collected at one-hour intervals at the beginning and end of the 30-day test period. At the fifteenth day, an abbreviated series of six flasks were taken. All sample flasks were returned to an independent laboratory for analysis. The results of the relative accuracy determination are shown in Tables C-17 and C-18 for the start and end of the 30-day tests. Both tests showed that the NO instrument greatly bettered the accuracy requirements of PS2. The relative accuracy of the Thermo Electron NO analyzer was about 8 percent based on the first test series and about 10.5 percent based on the final test series. The relative accuracy requirement published in PS2 is $\leq$ 20 percent of mean reference value.

3.2 RESIDUAL-OIL-FIRED BOILER TESTS

The continuous monitor was installed by KVB personnel on March 13, 1979, at Site 2, a residual-oil-fired water tube boiler. A single unheated 9.5 mm (3/8-inch) nylon sample line was strung from the duct downstream of the combustion air preheater to the continuous monitor. A single stainless steel filter was installed on the centerline of the duct. Particulate samples were taken from three ports on the side of the duct.

The boiler was initially tested in the as-found condition on March 15, 1979. The boiler load during this test was 16.1 MW thermal input (55,000 lb steam/hr). All burners were in service at this time.

Following the tests in the as-found condition, boiler operation was adjusted, under KVB supervision, to the low NO_x configuration. The top burner in the triangular arrangement was taken out of service. All air registers remained 100 percent open.

Triplicate Method 5 particulate tests were completed after boiler operation in the low NO_x mode stabilized. Triplicate Method 5 measurements under low NO_x operation were also made at the end of the 30-day test period. Method 5 particulate tests were also conducted with all burners in service. During one low NO_x particulate test and one baseline test, samples were collected for POM analysis. The method for collecting this sample was described in paragraph 2.1.3.

Fuel oil samples were collected periodically and submitted to an independent laboratory for analysis. Fuel samples were taken each time a particulate test was made and each time an oil delivery or change of tanks occurred.

A daily summary of the gaseous emissions observations is presented in Table 3-3 for each day of testing. In addition to the strip chart recording of each analyzer, readings were taken five times daily beginning at 0800. Boiler operating data were recorded four times daily and a 24-hour record of steam flow was obtained. A control room data sheet for this test site is included in Appendix B.

3.2.1 Gaseous Emissions

The boiler at Site 2 was tested during a previous EPA-sponsored program (Reference 1). During the previous tests the effect of boiler load on NO_x emissions was determined over a range of thermal output of 11.7 to

TABLE 3-3. SUMMARY OF OBSERVATIONS, COMMENTS AND GASEOUS AND PARTICULATE EMISSIONS SITE 2, RESIDUAL-OIL-FIRED BOILER

Date	Steam Flow		O_2	CO_2	NO		CO		Particulate		Opacity	Stack Temp	Comments
	MW	10^3 lb/hr	% dry	% dry	ppm	ng/J	ppm	ng/J	lb/10^6 Btu	ng/J	%	°F	
3-14	16.4	56.0	8.8	8.5	281	158	Instrument		0.0551	23.676	0	440	Baseline, all burners firing
3-15	16.1	55.0	8.9	9.5	252	142	out of		0.0475	20.409	0	440	Baseline, part test 1-1, 1-2, all burners firing
3-16	16.0	54.7	8.3	11.2	186	104	Service		0.0849	36.521	4	458	Baseline of BOOS* Particulate test 2-1
3-17	15.3	52.2	7.5	12.2	239	134	↓						
3-18	18.1	61.8	8.3	9.6	240	135			0.0760	32.666		460	BOOS, All burners firing
3-19	16.4	55.9	7.8	12.0	194	109			0.0653	28.084	3	455	Particulate tests 2-2, 2-3, PDS, BOOS
3-20	16.6	56.8	7.6	12.8	167	94					0		BOOS
3-21	16.6	56.5	7.5	10.5	165	93					0		BOOS
3-22	16.4	56.0	7.6	10.2	170	96					0		BOOS
3-23	16.6	56.8	7.6	9.9	166	93					0		BOOS
3-24	16.4	56.0	8.3	9.7	194	109							BOOS
3-25	16.3	55.8	8.3	9.7	138	77							BOOS
3-26	16.4	56.0	7.8	10.2	180	101					4		BOOS
3-27	16.6	56.8	7.9	10.4	148	83							Technician ill, BOOS
3-28	16.5	56.3	7.9	10.2	180	101					0		Vacuum pump out NO_x 5 hr avg, BOOS
3-29	9.7	33.0	10.7	7.7	I.O.O.S.	-					4		Vacuum pump out, low load, BOOS, High O_2
3-30	12.6	43.0	10.3	8.8	220	124					0		Low load, High O_2, BOOS
3-31	13.9	47.4	10.2	8.2	218	122							Low load, High O_2
4-1	13.6	46.4	11.2	7.4	226	127							Low load, High O_2, BOOS
4-2	15.8	53.8	8.0	9.7	161	90					3		BOOS
4-3	16.1	55.0	8.6	9.9	I.O.O.S.	-					3		BOOS
4-4	16.0	54.8	7.3	10.1	161	90					0		BOOS
4-5	16.0	54.5	7.2	10.1	163	92					0		BOOS
4-6	16.3	55.8	6.9	10.2	161	90	21	7			1		BOOS
4-7	17.2	58.7	7.1	10.4	187	105							All burners firing
4-8	20.6	70.3	6.3	10.5	230	129							All burners firing
4-9	21.2	72.5	6.55	10.7	223	125	19	6			7		High load
4-10	20.2	69.0	7.7	9.9	234	132	17	6			9		High load, all burners firing
4-11	13.9	47.5	10.0	7.9	232	130	22	8			9		High load, High O_2, BOOS
4-12	16.3	55.7	7.6	10.0	216	121	20	7			8		High load, all burners firing
4-13	19.6	66.8	9.2	8.4	243	137	23	8			10		High load, all burners firing
4-14	18.5	63.1	7.0	10.0	252	141							All burners firing
4-15	18.9	64.5	7.3	10.1	209	117							All burners firing
4-16	19.7	67.3	7.5	10.1	242	136	19	6			3		All burners firing
4-17	16.4	56.0	7.6	9.9	224	126	19	6	0.0757	32.557	11	435	All burners firing particulate/ POM 1-3
4-18	16.8	57.5	8.1	9.7	165	93	25	9	0.1088	46.785	4	428	Particulate/POM test 2-4, BOOS
4-19	16.5	56.3	8.0	9.8	164	92	25	9	0.1038 0.0882	44.650 37.943	2	428 439	Particulate 2-5, 2-6, BOOS PDS flasks

*BOOS: Burner out of service

23.1 MW (40,000 to 79,000 lb/hr steam flow). These data are shown in Figure D-1 in Appendix D which shows that the maximum NO_x levels occur at approximately 19.6 MW (67,000 lb/hr steam flow). The maximum NO_x level measured was 245 ppm (3 percent O_2, dry). The NO_x level at 17.6 MW (60,000 lb/hr), the test condition for one burner out of service, was 240 ppm.

During this program, no provision was included for evaluating the effect of various operating parameters on NO_x emissions. Instead, the conditions previously determined to yield low NO_x operation were duplicated as nearly as possible. The boiler was tested in the as-found condition at the initiation of the test program. Since the maximum capacity of the boiler with one burner out of service is approximately 16.4 MW (56,000 lb/hr steam flow) the boiler was tested in the as-found conditions at this load.

The effect of excess oxygen on NO_x emissions is shown in Figure 3-1 for the boiler at Site 2. Excess oxygen was not intentionally varied, but normal operation resulted in some variation in excess oxygen due to operator technique and the lack of sufficient instrumentation and controls to accurately hold a given excess air condition. The lower curve corresponds to operation with one burner out of service (staged combustion air). The upper curve represents the condition where all burners are firing normally. The solid points in the upper curve are at a higher load condition: 19.6 to 21.1 MW (67,000 to 72,000 lb steam/hour). As the previous data showed, operation at higher load resulted in about a 5 ppm increase over the test load condition.

Over the 30-day period during which the test was performed, there were occasions where the demand was greater than the boiler could provide with one burner out of service. The operators then put the third burner back in service. As a result, the 30-day average represents operation in the low NO_x mode except for the periods when steam demand precluded staged combustion.

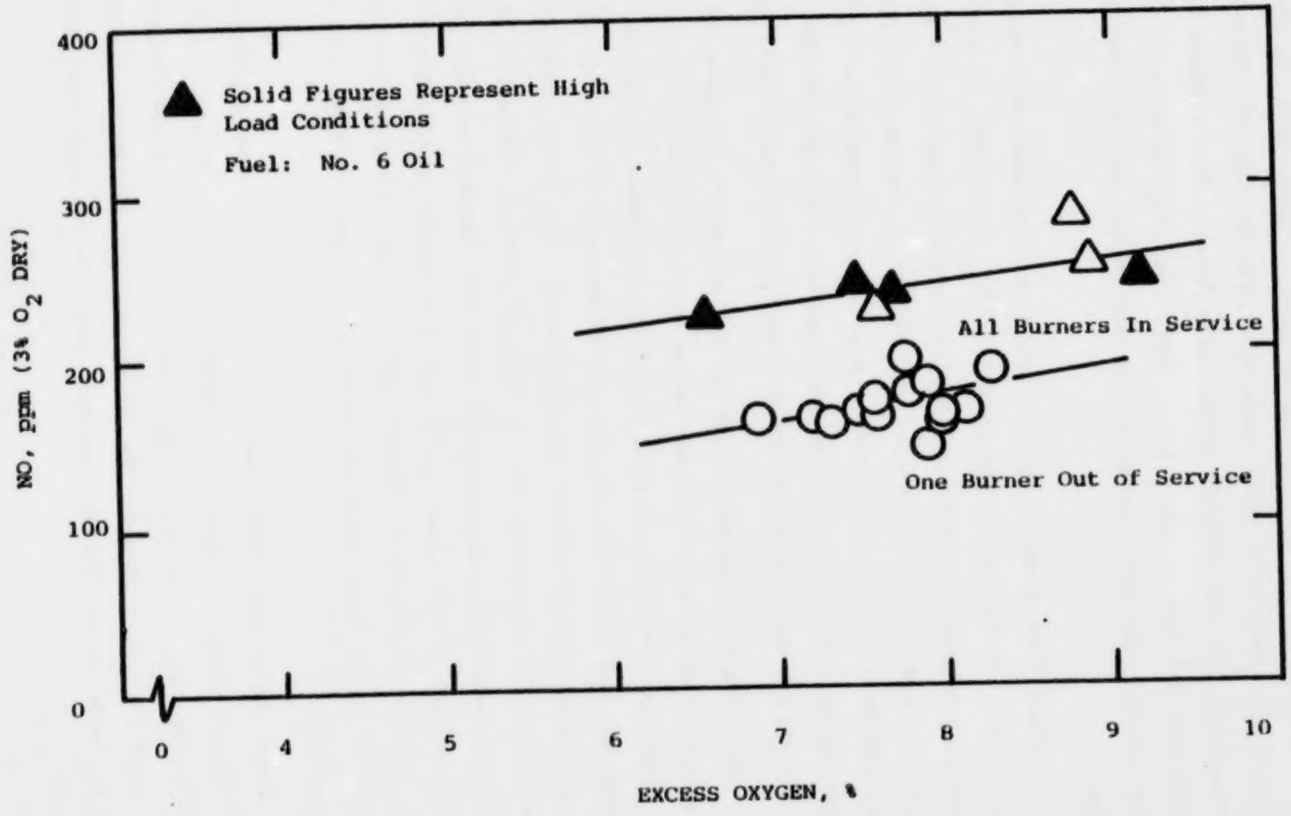


Figure 3-1. The Effect of Excess Oxygen on NO Emissions Site 2 - Residual-Oil-Fired Boiler.

3.2.2 Particulate Emissions

The results of the particulate tests conducted at Site 2 are presented in Table 3-4 for the baseline and low NO_x test conditions. Two of the tests were also used for collecting samples for analysis of polycylic organic matter (POM) by modifying the EPA Method 5 train as described in paragraph 2.1.3. The average particulate loading for baseline conditions, all burners firing, was measured at 25.6 ng/J (0.0594 lb/10^6 Btu). The average particulate in the low NO_x condition, one burner out of service, was 37.8 ng/J (0.0878 lb/10^6 Btu). The average particulate loading increased 48 percent due to operation in the low NO_x mode.

Visual inspection of the particulate filter in the sampling train showed a much darker particulate deposit, indicating that the particulate contained considerable unburned carbon in the low NO_x mode.

The particulate data for this test site were plotted as a function of excess oxygen in the stack. Figure 3-2 shows particulate loading as a function of stack excess oxygen. The data indicate that particulate loading is not a function of excess oxygen alone. It can also be seen from these data that operation in the low NO_x mode with one burner out of service results in higher particulate loading.

3.2.3 POM Emissions

Samples were collected for analysis of polycyclic organic matter (POM) using a Method 5 sampling train with XAD-2, a POM absorber, inserted. Sample time was extended to two hours to provide a large enough sample for Battelle to analyze. Following the sampling period, the organic resin module was sealed and returned to Battelle Columbus Laboratories for analysis. The sampling probe and glassware were washed with a 50-50 mixture of methylene chloride and methanol per Battelle instructions. The filter and wash were also sent to Battelle following weighing.

These samples were analyzed by capillary-EI GC-MS utilizing a 30M SE-52 column with hydrogen as a carrier gas. All data were collected by single ion monitoring to improve selectivity and sensitivity.

TABLE 3-4. PARTICULATE DATA SUMMARY FOR SITE 2
RESIDUAL-OIL-FIRED BOILER

Test No.	Date 1979	Load		O_2 %	Opacity %	Particulate		Description
		MW	10^3 lb/hr			ng/J	lb/10^6 Btu	
1-1	3-15	16.1	55	8.9	0	20.4	0.0475	Baseline
1-2	3-15	16.1	55	9.0	0	23.7	0.0551	Baseline
2-1	3-16	16.1	55	8.1	3	36.5	0.0849	Low NO_x
2-2	3-19	16.4	56	7.7	2	28.1	0.0653	Low NO_x
2-3	3-19	16.4	56	7.4	2	32.7	0.0760	Low NO_x
1-3	4-17	16.4	56	7.6	11	32.6	0.0757	Baseline/POM
2-4	4-18	17.0	58	8.1	3	46.8	0.1088	Low NO_x/POM
2-5	4-19	16.4	56	7.8	2	44.6	0.1038	Low NO_x
2-6	4-19	16.4	56	8.0	2	37.9	0.0882	Low NO_x

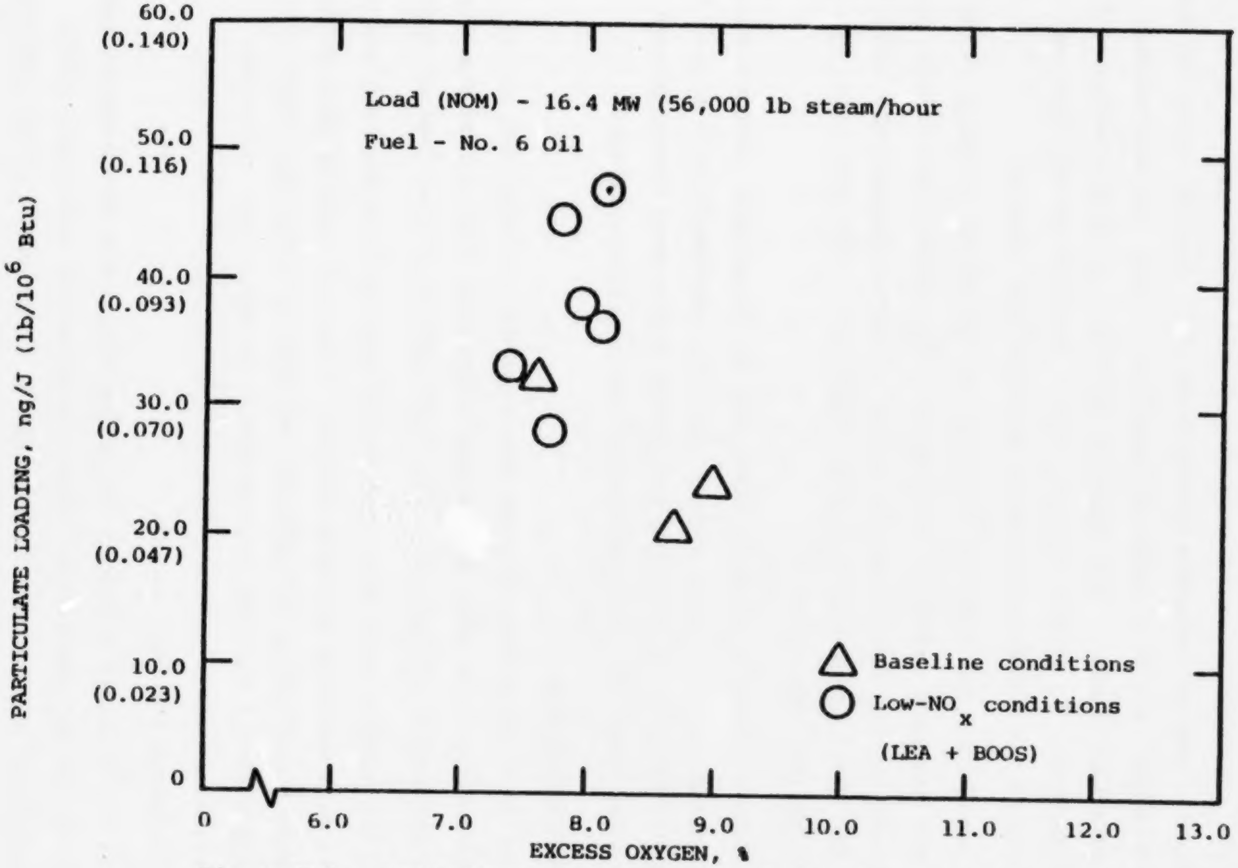


Figure 3-2. Particulate Loading vs. Stack Excess Oxygen for 30-Day Test Location 6017-2

The results of the analyses are presented in µg per total sample. The quantitative detection limit was 0.5 µg; thus samples with POM present at levels lower than this are reported as <0.5 µg (the standard deviation at lower levels was prohibitively high for accurate quantification). Samples reporting POM values of ND (none detected) are at a level of less than 0.1 µg (the approximate qualitative detection limit). The standard deviation on points around 0.5 µg averaged ±20 percent. At levels around 5 µg it averaged ±15 percent, and at levels above 12 µg the standard deviation averaged ±10 percent.

The results of the Battelle analyses are presented in Table 3-5 for the low NO_x and baseline operating conditions. The first three columns present the data for the low NO_x test; the last three columns represent the baseline condition. The XAD-2 module was analyzed separately, with the filter and probe wash samples combined for analysis.

The data indicate a slightly lower (18 to 30 percent) concentration of POM when operating in the low NO_x mode. The only components with significant levels are phenanthrene, anthracene, and methyl anthracenes/phenanthrenes. POM accounted for less than 0.01 percent of the total particulate.

3.2.4 Boiler Efficiency

Boiler efficiency calculations were made for as-found and low NO_x operating conditions. The ASME Abbreviated Efficiency Test method was used to determine the boiler efficiency. This test method is described in Appendix A.

Fuel oil samples were collected during each particulate test and when oil shipments were received or tanks changed. Fuel oil samples were submitted to an independent laboratory for ultimate and heating value analyses. The results of the fuel oil analyses are tabulated in Table 3-6. The data, tabulated chronologically, indicate that oil properties did not change significantly during the test period.

Table 3-7 presents a summary of boiler efficiency measurements made at baseline and low NO_x conditions. The average boiler efficiency under baseline conditions (all burners firing) was 81.9 percent; average efficiency under low NO_x conditions (one burner out of service) was 82.6 percent or an average increase of 0.7 percent.

Table 3-5. SUMMARY OF POM ANALYSES FOR SITE 2 - RESIDUAL-OIL-FIRED BOILER

	BASELINE TEST						LOW NOx TEST					
	XAD-2 MODULE		FILTER AND PROBE WASH		TOTAL		XAD-2 MODULE		FILTER AND PROBE WASH		TOTAL	
POM	μg	μg/m^3	μg	μg/m^3	μg	μg/m^3	μg	μg/m^3	μg	μg/m^3	μg	μg/m^3
Phenanthrene	1.8	1.04	1.6	0.92	3.4	1.96	1.2	0.68	1.7	0.97	2.9	1.66
Anthracene	0.9	0.52	ND	ND	0.9	0.52	<0.5	<0.28	ND	ND	<0.5	<0.28
Methyl Anthracenes/Phenanthrenes	3.6	2.07	1.3	0.75	4.9	2.82	3.2	1.83	0.6	0.34	3.8	2.17
Fluoranthene	0.5	0.29	<0.5	<0.29	0.5<1.0	0.29<0.58	<0.5	<0.28	<0.5	<0.28	<1.0	<0.57
Pyrene	0.6	0.34	<0.5	<0.29	0.6<1.1	0.34<0.63	<0.5	<0.28	<0.5	<0.28	<1.0	<0.57
Methyl Pyrene/Fluoranthene	<0.5	<0.29	<0.5	<0.29	<1.0	<0.58	<0.5	<0.28	ND	ND	<0.5	<0.28
Benzo[c]phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benz[a]anthracene	<0.5	<0.29	<0.5	<0.29	<1.0	<0.58	<0.5	<0.28	<0.5	<0.28	<1.0	<0.57
Chrysene	0.6	0.34	<0.5	<0.29	0.6<1.1	0.34<0.63	<0.5	<0.28	<0.5	<0.28	<1.0	<0.57
Methyl Chrysenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethylbenzanthracenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzofluoranthenes	0.9	0.52	ND	ND	0.9	0.52	0.8	0.46	<0.5	<0.28	0.8<1.3	0.46<0.74
Benz[e]pyrene	0.7	0.40	ND	ND	0.7	0.40	<0.5	<0.28	<0.5	<0.28	<1.0	<0.57
Benz[a]pyrene	ND	ND	ND	ND	ND	ND	ND	ND	<0.5	<0.28	<0.5	<0.28
Perylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno-pyrene	<0.5	<0.29	<0.5	<0.29	<1.0	<0.58	ND	ND	ND	ND	ND	ND
Benzo[ghi]perylene	<0.5	<0.29	<0.5	<0.29	<1.0	<0.58	<0.5	<0.28	<0.5	<0.28	<1.0	<0.57
3-Methylcholanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzanthracenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzpyrenes	ND	ND	0.5	0.29	0.5	<0.29	ND	ND	0.5	0.28	0.5	<0.28
Coronene	<0.5	<0.29	0.7	0.40	0.7<1.2	0.4<0.69	<0.5	<0.28	0.5	0.28	0.5<1.0	0.28<0.57
Sample Volume	1.739						1.751					

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TABLE 3-6. SUMMARY OF FUEL OIL ANALYSES FROM SITE 2, RESIDUAL-OIL-FIRED BOILER

	Dates and Sample Numbers		
	3-15-79	3-16-79	3-19-79
	1	2	3
Carbon, %	85.78	85.82	85.86
Hydrogen, %	12.26	12.16	12.14
Nitrogen, %	0.27	0.28	0.28
Sulfur, %	0.97	0.93	0.94
Ash, %	0.021	0.027	0.027
Oxygen (by difference), %	0.70	0.78	0.75
API Gravity at 60°F	21.6	21.6	21.6
Gross Heat of Combustion, Btu/lb	18,950	19,000	18,960
Net Heat of Combustion, Btu/lb	17,830	17,890	17,850

	3-20-79	4-12-79	4-17-79
	4	5	6
Carbon, %	85.76	86.21	86.24
Hydrogen, %	12.03	12.08	12.10
Nitrogen, %	0.24	0.24	0.24
Sulfur, %	0.99	0.85	0.88
Ash, %	0.028	0.026	0.025
Oxygen (by difference), %	0.95	0.59	0.52
API Gravity at 60°F	21.7	20.9	21.9
Gross Heat of Combustion, Btu/lb	19,000	19,050	19,020
Net Heat of Combustion, Btu/lb	17,900	17,950	17,920

	4-18-79	4-18-79	4-19-79
	7	8	9
Carbon, %	86.00	85.97	85.85
Hydrogen, %	12.06	11.97	11.97
Nitrogen, %	0.27	0.27	0.28
Sulfur, %	0.96	0.96	1.02
Ash, %	0.024	0.024	0.024
Oxygen (by difference), %	0.69	0.81	0.86
API Gravity at 60°F	21.2	20.7	20.9
Gross Heat of Combustion, Btu/lb	19,000	18,980	19,040
Net Heat of Combustion, Btu/lb	17,900	17,890	17,950

TABLE 3-7. SUMMARY OF BOILER EFFICIENCY CALCULATIONS FOR SITE 2, RESIDUAL-OIL-FIRED BOILER

Test No. Date	1-1 3/15/79	1-2 3/15/79	2-1 3/16/79	2-2 3/19/79	2-3 3/19/79	1-3 4/17/79	2-4 4/18/79	2-5 4/19/79	2-6 4/19/79
Test Load									
10^3 lb/hr	55	55	55	56	56	56	58	56	56
MW	16.1	16.1	16.1	16.4	16.4	16.4	17.0	16.4	16.4
% of Capacity	61.11	61.11	61.11	62.22	62.22	62.22	64.44	62.22	62.22
Stack O_2, %	8.9	8.9	7.5	7.8	7.8	7.6	8.1	8.0	8.0
Stack CO, ppm	I.O.O.S.	I.O.O.S.							0.0
Stack Temp. (K/°F)	500/440	500/440	510/458	508/455	511/460	497/435	493/428	493/428	499/439
Ambient Temp. (K/°F)	294/70	294/70	294/70	294/70	294/70	294/70	294/70	294/70	294/70
Boiler Heat Losses									
Dry Gas, %	10.58	10.58	10.42	8.79	8.90	10.03	10.79	9.89	10.19
Moisture in Fuel, %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Moisture from H_2, %	6.76	6.76	6.69	6.57	6.57	6.65	6.59	6.57	6.57
Combustibles, %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Radiation, %	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Losses, %	18.34	18.34	18.11	16.35	16.47	17.68	18.38	17.46	17.76
Boiler Efficiency, %	81.66	81.66	81.89	83.65	83.53	82.32	81.62	82.54	82.24

Average Baseline Efficiency $\bar{n}$ = 81.9%

Average Low NO_x Efficiency $\bar{y}$ = 82.6%

3.2.5 Data Reduction

The gaseous emissions data measured by the analyzers were recorded on strip chart recorders as described earlier. An automatic data logger was ordered but was not available for this 30-day test. The only alternative was manual reduction of strip chart records and punched cards for computer data input as was the case for Site 1. This procedure required a very large manpower effort to produce the data required for analysis.

Strip chart records were collected from the recorders along with copies of the appropriate control room data logs. The recorder charts were reviewed to detect any possible data gaps. In addition, the strip chart records were verified by comparison with measurements recorded by a technician on a two-hour basis.

A tabulation of 15-minute averages was compiled for the entire test period. After the data were compiled, they were spot checked and edited to detect obvious errors and anomalies. The data were then keypunched on cards for input to the computer. Figure 3-3 shows an example of the list of 15-minute averages. The entire list of 15-minute averages is presented in Appendix F.

After data editing was completed, 24-hour averages were calculated For an average to be valid, at least 75 percent of the 15-minute points in that interval had to be valid. Figure 3-4 shows a summary of the 24-hour averages for the 30-day test at Site 1.

A statistical summary was prepared to determine the following parameters for the 24-hour averages: mean, standard deviation, maximum, minimum, range, and average deviation. These parameters were calculated assuming the data were normally distributed. The 24-hour averages were tabulated in ascending order and divided into 10 groups. A frequency histogram was then prepared. Table 3-8 presents the frequency distribution of the 24 hour averages of NO emissions of all data. These data were then plotted to determine the distribution. When the data were plotted on normal probability paper (Figure 3-5) it was apparent that the data were not normally

```
*****************************************************************
**                   15 MIN. DATA                              **
**              DRY STACK GAS CONCENTRATION                    **
**                                                             **
**                          O2     CO2     NO     NO     NO    **
**                  LOAD   VOL%    VOL%   PPMV   PPMV   NG/J   **
**   DATE    TIME   MWTH   MEAS    MEAS   MEAS   3%O2          **
*****************************************************************
** 3/14/79   1215   11.4    9.6     7.9   162.   257.   142.   **
** 3/14/79   1230   11.4    9.7     7.9   161.   258.   142.   **
** 3/14/79   1245   11.4    9.7     7.9   156.   249.   137.   **
** 3/14/79   1300   11.4    9.7     7.9   153.   246.   136.   **
** 3/14/79   1315   13.6    9.6     8.3   165.   262.   145.   **
** 3/14/79   1330   13.6    9.1     8.7   173.   263.   145.   **
** 3/14/79   1345   13.6    8.5     8.9   184.   267.   147.   **
** 3/14/79   1400   13.6    8.4     8.9   186.   268.   148.   **
** 3/14/79   1415   16.3    8.3     8.9   189.   269.   148.   **
** 3/14/79   1430   16.3    8.4     8.9   191.   273.   151.   **
** 3/14/79   1445   16.3    8.3     8.9   193.   275.   152.   **
** 3/14/79   1500   16.3    8.3     8.9   196.   279.   154.   **
** 3/14/79   1515   16.4    8.3     8.9   199.   282.   156.   **
** 3/14/79   1530   16.4    8.3     8.9   200.   285.   157.   **
** 3/14/79   1545   16.4    8.3     8.9   203.   289.   159.   **
** 3/14/79   1600   16.4    8.3     8.9   203.   289.   159.   **
** 3/14/79   1615   16.4    8.4     8.9   191.   274.   151.   **
** 3/14/79   1630   16.4    8.5     8.9   191.   275.   151.   **
** 3/14/79   1645   16.4    8.5     8.9   191.   274.   151.   **
** 3/14/79   1700   16.4    8.5     8.9   190.   274.   151.   **
** 3/14/79   1715   16.3    8.5     8.8   190.   274.   151.   **
** 3/14/79   1730   16.3    8.5     8.8   189.   274.   151.   **
** 3/14/79   1745   16.3    8.5     8.8   189.   274.   151.   **
** 3/14/79   1800   16.3    8.6     8.8   188.   273.   150.   **
** 3/14/79   1815   16.3    8.6     8.8   186.   272.   150.   **
** 3/14/79   1830   16.3    8.6     8.8   185.   270.   149.   **
** 3/14/79   1845   16.3    8.7     8.8   183.   268.   148.   **
** 3/14/79   1900   16.3    8.6     8.8   182.   266.   147.   **
** 3/14/79   1915   16.3    8.6     8.8   180.   262.   144.   **
** 3/14/79   1930   16.3    8.6     8.9   179.   260.   143.   **
** 3/14/79   1945   16.3    8.5     8.9   178.   258.   142.   **
** 3/14/79   2000   16.3    8.5     8.9   177.   256.   141.   **
** 3/14/79   2015   16.3    8.5     8.9   176.   253.   140.   **
** 3/14/79   2030   16.3    8.5     8.9   173.   250.   138.   **
** 3/14/79   2045   16.3    8.5     8.9   172.   248.   137.   **
** 3/14/79   2100   16.3    8.5     8.9   172.   249.   137.   **
** 3/14/79   2115   16.1    8.5     8.9   172.   250.   138.   **
** 3/14/79   2130   16.1    8.5     8.9   173.   251.   138.   **
** 3/14/79   2145   16.1    8.5     8.8   173.   251.   138.   **
** 3/14/79   2200   16.1    8.6     8.8   171.   248.   137.   **
** 3/14/79   2215   16.1    8.5     8.8   173.   250.   138.   **
** 3/14/79   2230   16.1    8.5     8.8   180.   260.   143.   **
** 3/14/79   2245   16.1    8.5     8.8   182.   263.   145.   **
** 3/14/79   2300   16.1    8.5     8.8   185.   267.   147.   **
** 3/14/79   2315   16.1    8.5     8.8   189.   274.   151.   **
** 3/14/79   2330   16.1    8.5     8.8   191.   277.   153.   **
** 3/14/79   2345   16.1    8.6     8.7   194.   282.   156.   **
** 3/14/79   2400   16.1    8.7     8.7   197.   289.   159.   **
*****************************************************************
```

Figure 3-3. Format of 15-Minute Emissions Data, Site 6017-2

```
****************************************************************************
**                              24 HOUR DATA                              **
**                     DRY STACK GAS CONCENTRATION                        **
**                                                                        **
**                              O2       CO2       NO       NO       NO   **
**                     LOAD    VOL%     VOL%     PPMV     PPMV     NG/J   **
**   DATE      TIME    MWTH    MEAS     MEAS     MEAS     3%O2            **
****************************************************************************
** 3/14/79             15.2     8.7      8.7     181.     266.     147.   **
** 3/15/79             16.0     9.0      9.2     183.     274.     151.   **
** 3/16/79             15.4     8.5     10.9     163.     236.     130.   **
** 3/17/79             15.3     8.1     11.9     157.     220.     121.   **
** 3/18/79             18.1     8.1     10.5     196.     273.     151.   **
** 3/19/79             16.5     7.7     11.4     162.     219.     121.   **
** 3/20/79             16.7     7.6     12.6     152.     204.     112.   **
** 3/21/79             16.6     7.5     11.4     132.     175.      97.   **
** 3/22/79             16.5     7.6     10.1     121.     163.      90.   **
** 3/23/79             16.5     7.6     10.1     119.     160.      88.   **
** 3/24/79             16.4     7.9      9.8     132.     182.     100.   **
** 3/25/79             16.3     8.5      9.6     135.     195.     107.   **
** 3/26/79             16.4     8.0      9.9     132.     183.     101.   **
** 3/27/79             16.6     7.8     10.4     111.     151.      83.   **
** 3/28/79             16.6     7.9     10.4     119.     164.      90.   **
** 3/29/79             11.2    10.5      8.8       0.       0.       0.   **
** 3/30/79             12.9    10.3      7.9     125.     216.     119.   **
** 3/31/79             13.9    10.1      8.3     133.     220.     121.   **
** 4/ 1/79             13.6    10.8      7.7     121.     214.     118.   **
** 4/ 2/79             15.7     9.2      8.9     127.     196.     108.   **
** 4/ 3/79             16.1     8.1      9.9     117.     163.      90.   **
** 4/ 4/79             16.0     8.3     10.1     123.     176.      97.   **
** 4/ 5/79             16.3     7.3     10.1     126.     165.      91.   **
** 4/ 6/79             16.8     7.1     10.1     123.     160.      88.   **
** 4/ 7/79             17.2     6.8     10.4     153.     194.     107.   **
** 4/ 8/79             20.6     6.7     10.5     163.     205.     113.   **
** 4/ 9/79             20.7     6.3     10.6     187.     229.     126.   **
** 4/10/79             17.8     6.8     10.5     181.     230.     127.   **
** 4/11/79             13.9    10.1      8.2     132.     218.     120.   **
** 4/12/79             17.3     8.1      9.6     165.     231.     127.   **
** 4/13/79             19.2     8.8      9.3     158.     234.     129.   **
** 4/14/79             18.5     6.7     10.1     181.     229.     126.   **
** 4/15/79             18.9     7.2     10.0     166.     218.     120.   **
** 4/16/79             19.5     7.4     10.1     173.     230.     127.   **
** 4/17/79             17.0     7.7     10.0     161.     218.     120.   **
** 4/18/79             16.8     7.9      9.9     137.     190.     105.   **
** 4/19/79             16.7     9.2      9.7     121.     184.     101.   **
****************************************************************************
```

Figure 3-4. Summary of 24-hour Average Data

TABLE 3-8. NO EMISSIONS FREQUENCY DATA
SITE 2

Cell	Frequency	Cum. Frequency	Plot Percent
83- 89.80	3	3	8.1
89.81- 96.60	4	7	18.9
96.61-103.40	5	12	32.4
103.41-110.20	4	16	43.2
110.21-117.00	2	18	48.7
117.01-123.80	8	26	70.3
123.81-130.60	7	33	89.2
130.61-137.40	0	33	89.2
137.41-144.20	0	33	89.2
144.21-151.00	3	36	97.3

g (geometric dispersion) = 1.17

$\bar{x}$ (geometric median) = 110 ng/J

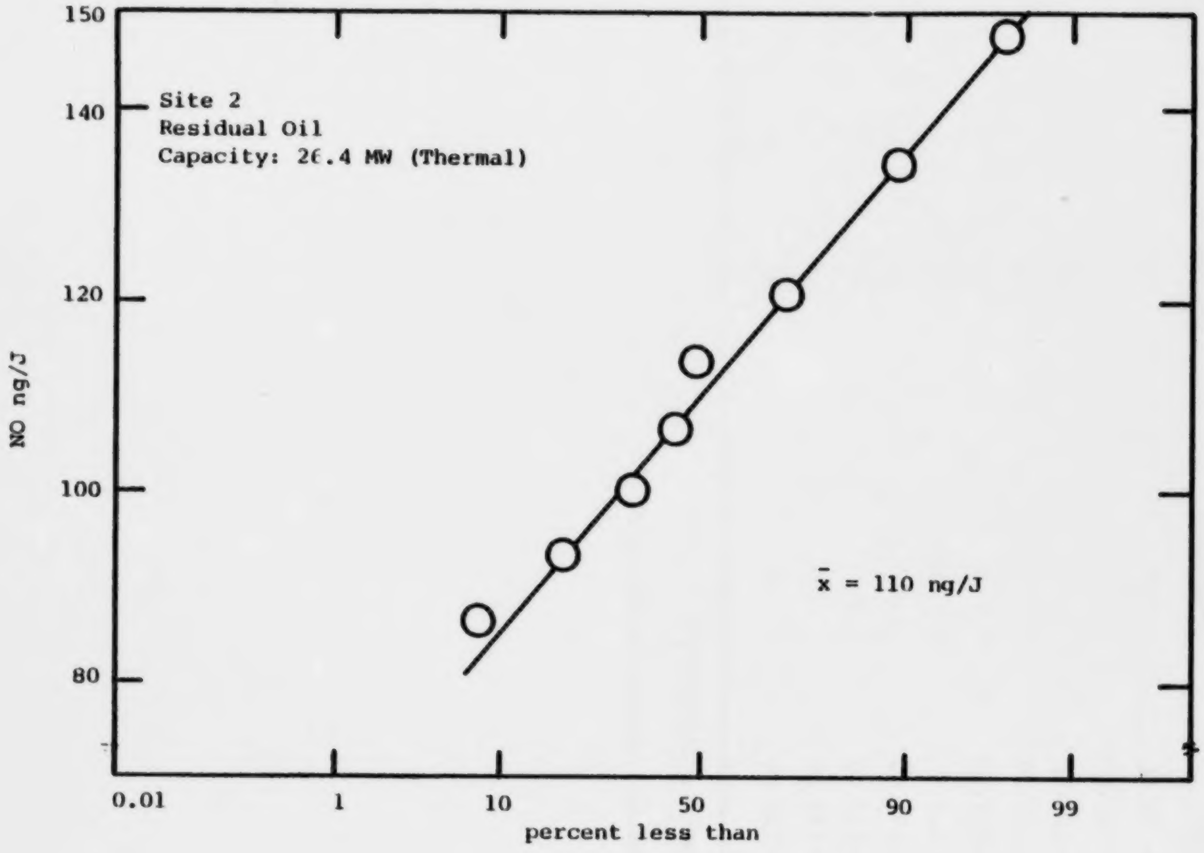


Figure 3-5. Normal-probability plot of 24-hour averages of NO emissions from a residual oil fired boiler.

distributed. Further analysis indicated that the data were log-normally distributed. The data and log sheets were reviewed to separate the emissions data into two groups corresponding to low NO_x firing conditions (one burner out of service) and normal operating conditions. Table 3-9 presents the frequency distribution of the boiler NO emissions while operating in the SCA condition. Table 3-10 shows the frequency distribution with the boiler operating in the normal mode. A log-normal plot of NO emissions is presented as Figure 3-6 for the residual oil fired boiler at Site 2 under low NO_x operating conditions. The graph shown in Figure 3-7 illustrates the performance of the residual oil fired boiler with all burners in service based on the 24-hour averages. The mean NO emission rate is 100 ng/J with a geometric dispersion of 1.12 while operating with SCA. The NO emission rate from the boiler while operating in the normal mode (all burners firing) was determined to be 130 ng/J with a geometric dispersion of 1.11.

A daily plot of the NO emissions is shown in Figure 3-8. This plot shows high levels in NO emissions when all burners are firing a large fraction of the day or when the excess O_2 level is high. Figure 3-9 presents a daily plot of excess O_2. High values of excess O_2 correspond to high NO emission rates, even if a burner is out of service. The high excess O_2 levels generally correspond to week-ends where KVB personnel were not on hand to advise the operational personnel on the excess air condition.

Staged combustion as a NO_x control technique resulted in a 23 percent reduction from the baseline value of 130 ng/J. Under low NO_x operation (SCA), 99 percent of the values were less than 130 ng/J. Under normal operating conditions, 99 percent of the values were less than 170 ng/J.

TABLE 3-9. FREQUENCY DATA FOR SITE 2 BOILER WITH SCA

Burner Status	Cell	Frequency	Cumulative Frequency	Percent Plot
2,3	81- 85	1	1	4
	86- 90	5	6	24
	91- 95	1	7	28
	96-100	3	10	40
	101-105	3	13	52
	106-110	3	16	64
	111-115	2	18	72
	116-120	2	20	80
	121-125	2	22	88
	126-130	2	24	96

$\bar{x}$ = 100 ng/J n = 24

g.d. = 1.12

TABLE 3-10. FREQUENCY DATA FOR SITE 2 BOILER UNDER NORMAL FIRING CONDITIONS

Burner Status	Cell	Frequency	Cumulative Frequency	Percent Plot
1,2,3	118-120	2	2	15
	121-213	2	4	31
	125-126	2	6	46
	129-129	2	8	62
	130-132	2	10	77
	133-135	0	10	77
	136-138	0	10	77
	139-141	0	10	77
	142-144	0	10	77
	145-147	1	11	85
	148-150	0	11	85
	151-153	0	11	85
	154-156	1	12	92

x = 130 ng/J

g.d. = 1.11

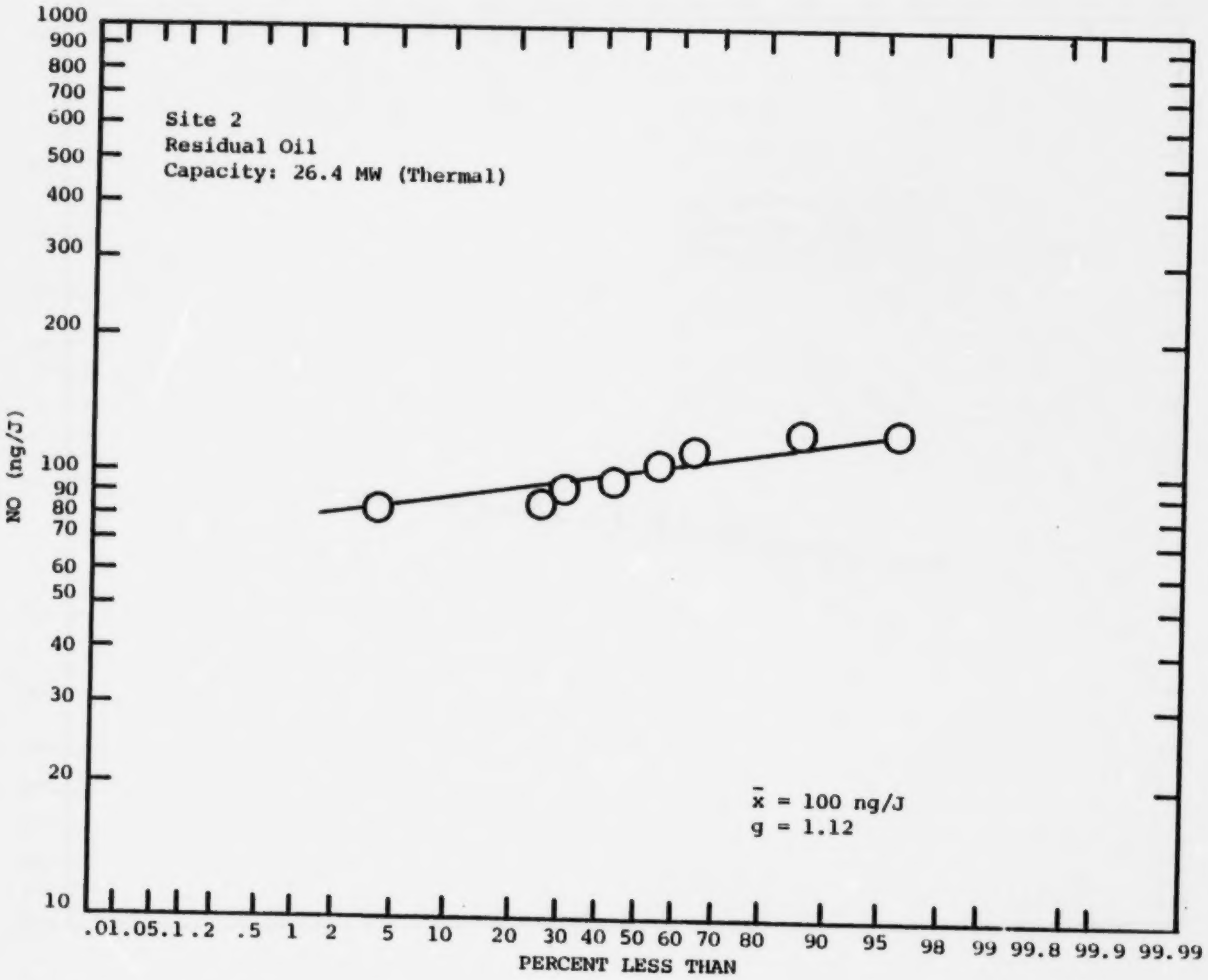


Figure 3-6. Log-Probability plot of 24-hour averages of NO Emissions from a Residual Oil Fired Boiler under low NO_x conditions.

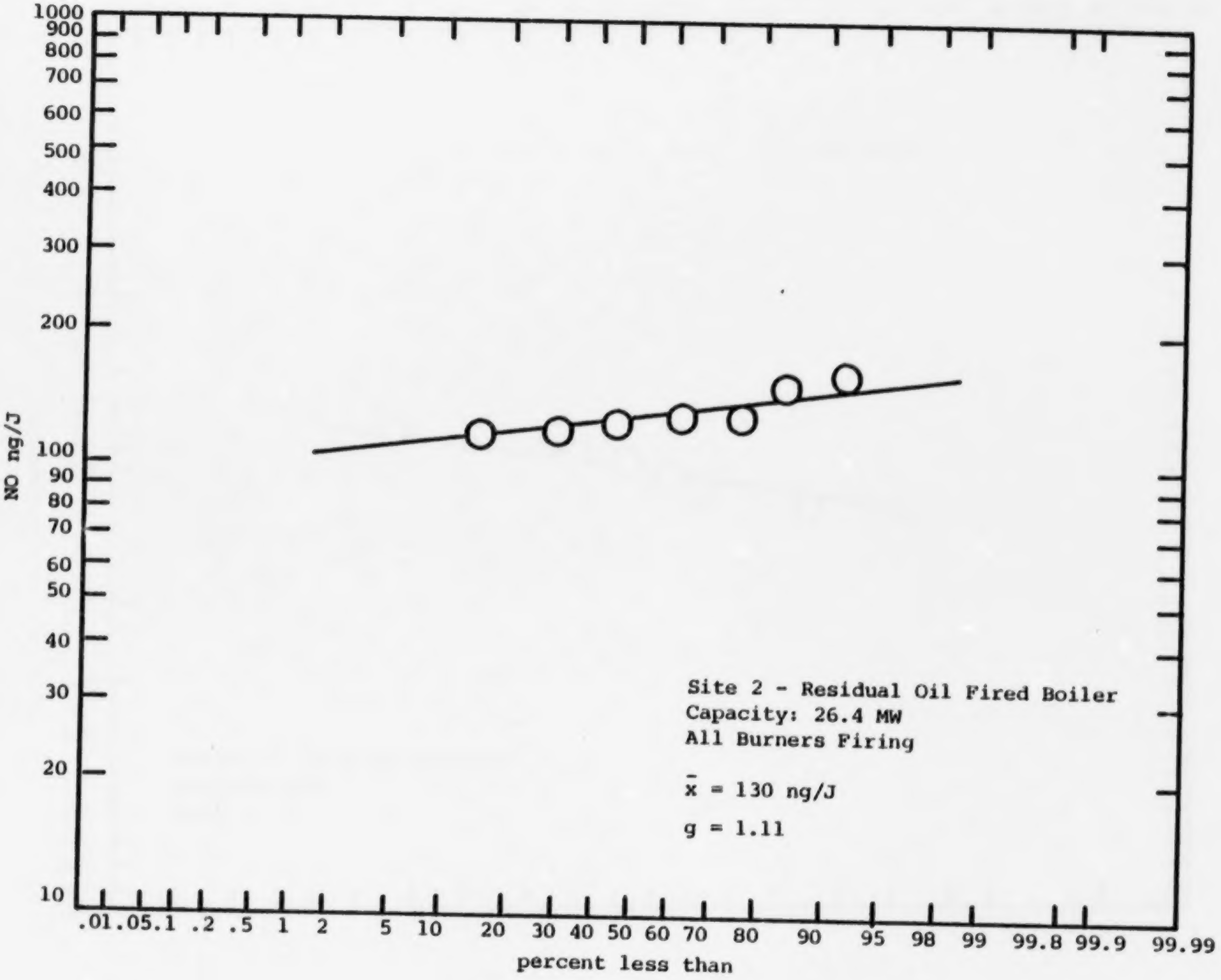


Figure 3-7. Log-Probability Plot of 24-Hour Averages of NO Emissions from a Residual Oil Fired Boiler under normal operation.

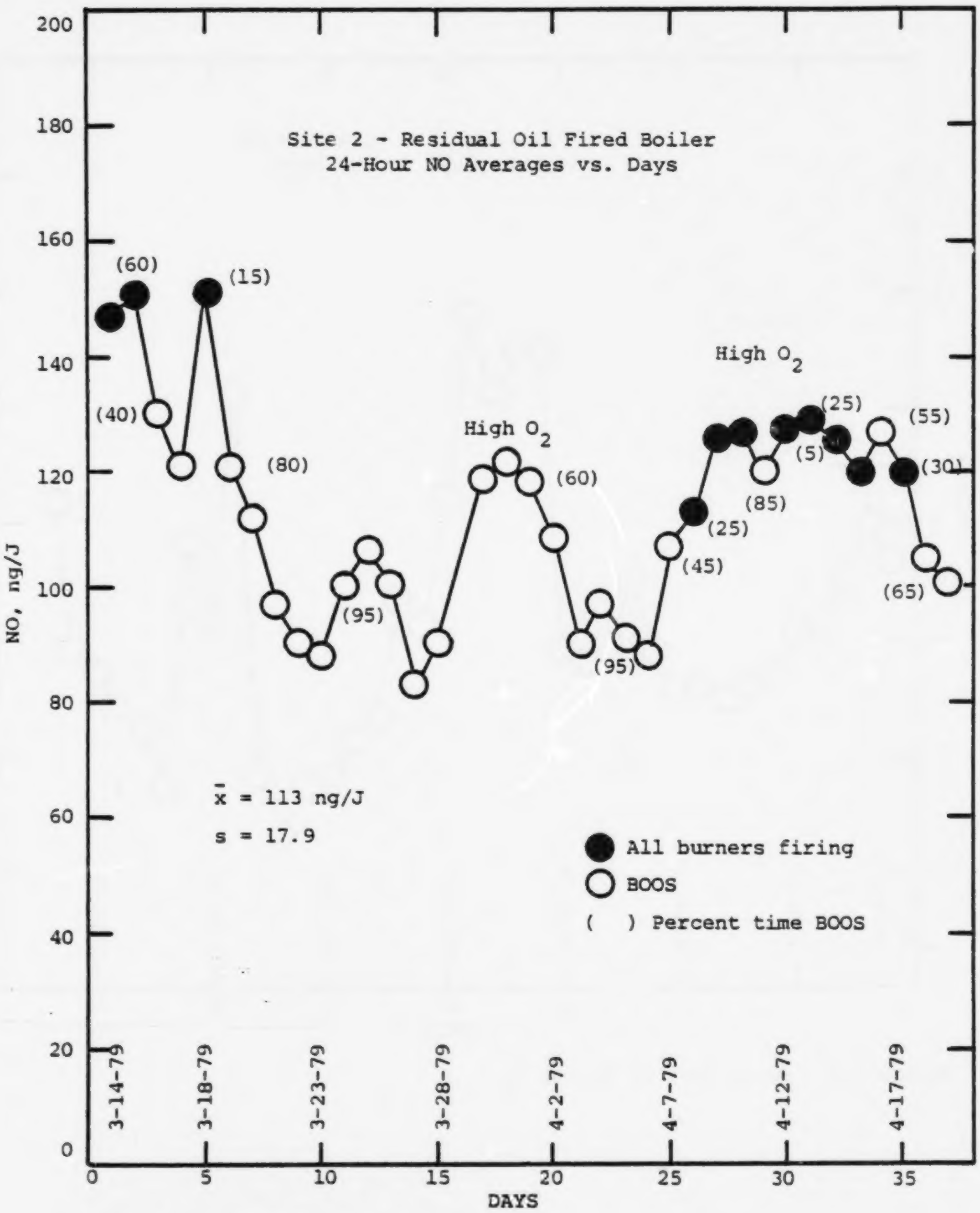


Figure 3-8. Daily Plot of NO Emissions

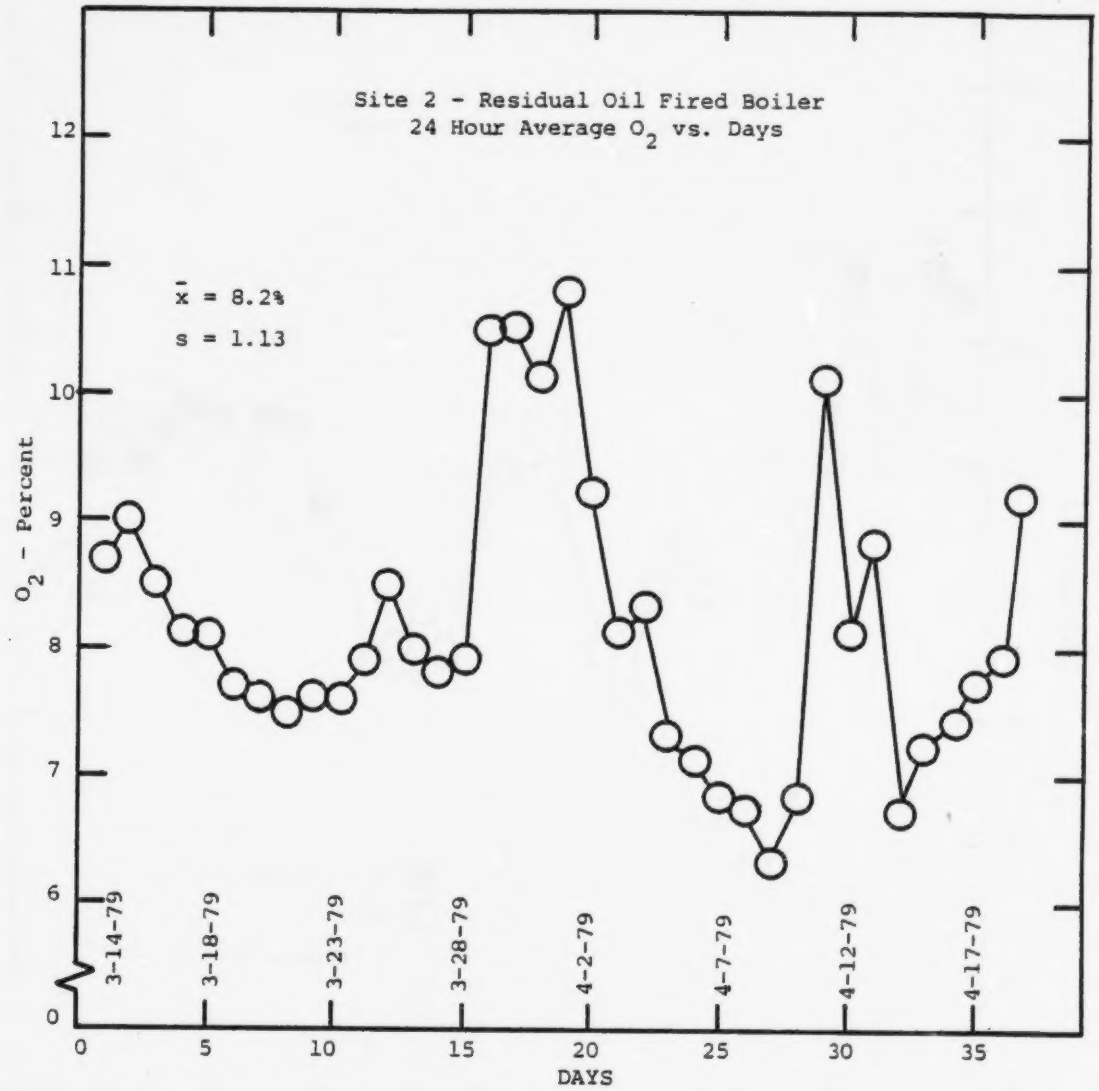


Figure 3-9. Daily Plot of Excess O_2

Emission factors for the residual oil fired boiler were calculated using the procedure set forth in 40CFR60, Subpart D. The NO emission factor (dry basis) was calculated using the following equation:

$$D = C_d F_d \frac{20.9}{20.9 - \% O_{2_d}}$$

Where E = Pollutant emission rate, ng/J (lb/million Btu)

C_d = NO concentration, ng/scm (lb/scf)

F_d = Stoichiometric conversion factor, 2.47×10^{-7} dscm/J (9,190 dscf/million Btu), for residual oil

O_{2_d} = Oxygen concentration, percent by volume, dry

The conversion of measured NO values (ppmv) to ng/scm is made by multiplying by 1.912×10^6. To convert from ppm to lb/scf, multiply by 1.19×10^{-7}.

NO_x emissions were measured as NO and the NO_x emission rates reported herein are calculated based on the molecular weight of NO_2.

SECTION 4.0

REFERENCES

1. Cato, G. A., et al., "Field Testing: Application of Combustion Modifications to Control Pollutant Emissions from Industrial Boilers - Phase I," EPA 650/2-74-078a, NTIS No. PB 238 920, June 1975.

2. Cato, G. A., et al., "Field Testing: Application of Combustion Modifications to Control Emissions from Industrial Boilers - Phase II," EPA 600/2-76-086a, NTIS No. PB 253 500, April 1976.

3. Maloney, K. L., et al., "Systems Evaluation of the Use of Low-Sulfur Western Coal in Existing Small and Intermediate-Sized Boilers," EPA Contract No. 68-02-1863, EPA 600/7-78-153a.

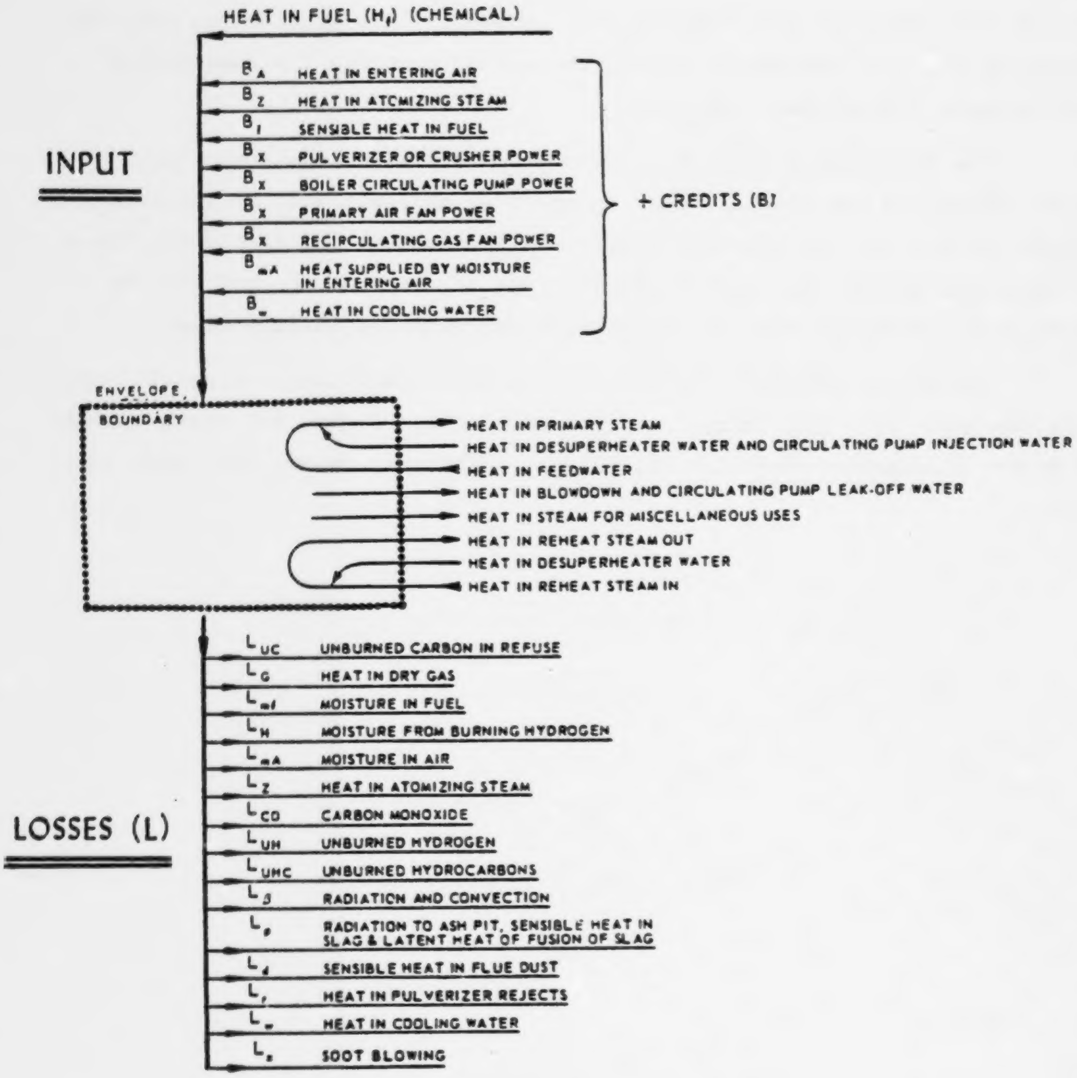
APPENDIX A

EFFICIENCY MEASUREMENTS

EFFICIENCY

Unit efficiencies for boilers are calculated and reported according to the ASME Power Test Codes for Steam Generation Units, PTC 4.1-1965. These codes present instructions for two acceptable methods of determining thermal efficiency. One method is the direct measurement of input and output and requires the accurate measurement of the quantity and high-heating value of the fuel, heat credits, and the heat absorbed by the working fluids. The second method involves the direct measurements of heat losses and is referred to as the heat loss method. This method requires the determination of losses, heat credits, and ultimate analysis and high-heat value of the fuel. Some of the major heat losses include losses due to heat in dry flue gas, losses due to fuel moisture content, losses due to combustible material in refuse and flue gas, and radiation losses. Heat credits are defined as those amounts added to the process in forms other than the chemical heat in the fuel "as fired." These include quantities such as sensible heat in the fuel, heat in the combustion air, and heat from power conversion in a pulverizer or fan. The relationships between input, output, credits, and losses for a steam generator are illustrated in Figure A-1.

KVB's experience has shown the heat-loss efficiency determination method to be the most reliable when working with industrial boilers. Accurate fuel input measurements are rarely possible on industrial boilers due to the lack of adequate instrumentation, thus making the input-output method undesirable. The accuracy of the efficiency based on the heat loss method is determined primarily by the accuracy of the flue gas temperature measurement immediately following the last heat removal station, the stack gas excess O_2 level, the fuel analysis, the ambient temperature, and proper identification of the combustion device external surfaces (for radiation losses). Determination of the radiation and other associated losses may appear to be a rather imposing calculation, but in practice it can be accomplished by utilizing standard efficiency calculation procedures. Inaccuracies in determining efficiency occasionally occur even with the heat


HEAT IN FUEL (H_f) (CHEMICAL)
INPUT
B_A HEAT IN ENTERING AIR
B_Z HEAT IN ATOMIZING STEAM
B_f SENSIBLE HEAT IN FUEL
B_X PULVERIZER OR CRUSHER POWER
B_X BOILER CIRCULATING PUMP POWER
B_X PRIMARY AIR FAN POWER
B_X RECIRCULATING GAS FAN POWER
B_{mA} HEAT SUPPLIED BY MOISTURE IN ENTERING AIR
B_w HEAT IN COOLING WATER
+ CREDITS (B)
ENVELOPE BOUNDARY
HEAT IN PRIMARY STEAM
HEAT IN DESUPERHEATER WATER AND CIRCULATING PUMP INJECTION WATER
HEAT IN FEEDWATER
HEAT IN BLOWDOWN AND CIRCULATING PUMP LEAK-OFF WATER
HEAT IN STEAM FOR MISCELLANEOUS USES
HEAT IN REHEAT STEAM OUT
HEAT IN DESUPERHEATER WATER
HEAT IN REHEAT STEAM IN
LOSSES (L)
L_{UC} UNBURNED CARBON IN REFUSE
L_G HEAT IN DRY GAS
L_{mf} MOISTURE IN FUEL
L_H MOISTURE FROM BURNING HYDROGEN
L_{mA} MOISTURE IN AIR
L_Z HEAT IN ATOMIZING STEAM
L_{CO} CARBON MONOXIDE
L_{UH} UNBURNED HYDROGEN
L_{UHC} UNBURNED HYDROCARBONS
L_β RADIATION AND CONVECTION
L_p RADIATION TO ASH PIT, SENSIBLE HEAT IN SLAG & LATENT HEAT OF FUSION OF SLAG
L_d SENSIBLE HEAT IN FLUE DUST
L_r HEAT IN PULVERIZER REJECTS
L_w HEAT IN COOLING WATER
L_s SOOT BLOWING

OUTPUT = INPUT − LOSSES

DEFINITION: EFFICIENCY (PERCENT) = $\eta_g (\%) = \frac{\text{OUTPUT}}{\text{INPUT}} \times 100 = \frac{\text{INPUT} - L}{H_f + B} \times 100$

HEAT BALANCE: $H_f + B = \text{OUTPUT} + L$ OR $\eta_g (\%) = \left[1 - \frac{L}{H_f + B}\right] \times 100$

Figure A-1. Heat balance of steam generator.

loss method primarily because of out-of-calibration unit instrumentation such as the stack gas exit temperature. However, this problem has been resolved by KVB test engineers through the use of portable instrumentation and separate temperature readings.

The abbreviated efficiency test procedure which considers only the major losses and the chemical heat in the fuel as input will be followed. Tables A-1 and A-2 are the ASME Test Forms for Abbreviated Efficiency Tests on steam generators which exemplify the type of forms to be used for recording the necessary data and performing the required calculations.

KVB has developed a program for the HP-67 calculator which will provide the heat loss efficiency from the stack data. Figure A-2 shows the HP-67 keyed calculation sheet for calculating efficiency by the ASME Heat Loss Method.

TABLE A-1

ASME TEST FORM FOR ABBREVIATED EFFICIENCY TEST

SUMMARY SHEET

PTC 4.1-a (1964)

	TEST NO.	BOILER NO.	DATE
OWNER OF PLANT	LOCATION		
TEST CONDUCTED BY	OBJECTIVE OF TEST		DURATION
BOILER MAKE & TYPE		RATED CAPACITY	
STOKER TYPE & SIZE			
PULVERIZER, TYPE & SIZE		BURNER, TYPE & SIZE	
FUEL USED	MINE	COUNTY	STATE	SIZE AS FIRED

PRESSURES & TEMPERATURES

1	STEAM PRESSURE IN BOILER DRUM	psia	
2	STEAM PRESSURE AT S. H. OUTLET	psia	
3	STEAM PRESSURE AT R. H. INLET	psia	
4	STEAM PRESSURE AT R. H. OUTLET	psia	
5	STEAM TEMPERATURE AT S. H. OUTLET	F	
6	STEAM TEMPERATURE AT R H INLET	F	
7	STEAM TEMPERATURE AT R.H. OUTLET	F	
8	WATER TEMP. ENTERING (ECON.)(BOILER)	F	
9	STEAM QUALITY % MOISTURE OR P. P. M.		
10	AIR TEMP. AROUND BOILER (AMBIENT)	F	
11	TEMP AIR FOR COMBUSTION (This is Reference Temperature) †	F	
12	TEMPERATURE OF FUEL	F	
13	GAS TEMP. LEAVING (Boiler) (Econ.) (Air Htr.)	F	
14	GAS TEMP. ENTERING AH (If conditions to be corrected to guarantee)	F	

UNIT QUANTITIES

15	ENTHALPY OF SAT. LIQUID (TOTAL HEAT)	Btu/lb	
16	ENTHALPY OF (SATURATED) (SUPERHEATED) STM.	Btu/lb	
17	ENTHALPY OF SAT. FEED TO (BOILER) (ECON.)	Btu/lb	
18	ENTHALPY OF REHEATED STEAM R. H. INLET	Btu/lb	
19	ENTHALPY OF REHEATED STEAM R. H. OUTLET	Btu/lb	
20	HEAT ABS/LB OF STEAM (ITEM 16 – ITEM 17)	Btu/lb	
21	HEAT ABS/LB R.H. STEAM (ITEM 19 – ITEM 18)	Btu/lb	
22	DRY REFUSE (ASH PIT + FLY ASH) PER LB AS FIRED FUEL	lb/lb	
23	Btu PER LB IN REFUSE (WEIGHTED AVERAGE)	Btu/lb	
24	CARBON BURNED PER LB AS FIRED FUEL	lb/lb	
25	DRY GAS PER LB AS FIRED FUEL BURNED	lb/lb	

HOURLY QUANTITIES

26	ACTUAL WATER EVAPORATED	lb/hr	
27	REHEAT STEAM FLOW	lb/hr	
28	RATE OF FUEL FIRING (AS FIRED wt)	lb/hr	
29	TOTAL HEAT INPUT $\frac{(\text{Item 28} \times \text{Item 41})}{1000}$	kB/hr	
30	HEAT OUTPUT IN BLOW-DOWN WATER	kB/hr	
31	TOTAL HEAT OUTPUT $\frac{(\text{Item 26} \times \text{Item 20}) + (\text{Item 27} \times \text{Item 21}) + \text{Item 30}}{1000}$	kB/hr	

FLUE GAS ANAL. (BOILER) (ECON) (AIR HTR) OUTLET

32	CO_2	% VOL	
33	O_2	% VOL	
34	CO	% VOL	
35	N_2 (BY DIFFERENCE)	% VOL	
36	EXCESS AIR	%	

FUEL DATA

	COAL AS FIRED PROX. ANALYSIS	% wt
37	MOISTURE	
38	VOL MATTER	
39	FIXED CARBON	
40	ASH	
	TOTAL	
41	Btu per lb AS FIRED	
42	ASH SOFT TEMP.* ASTM METHOD	

	COAL OR OIL AS FIRED ULTIMATE ANALYSIS	
43	CARBON	
44	HYDROGEN	
45	OXYGEN	
46	NITROGEN	
47	SULPHUR	
40	ASH	
37	MOISTURE	
	TOTAL	

	COAL PULVERIZATION	
48	GRINDABILITY INDEX*	
49	FINENESS % THRU 50 M*	
50	FINENESS % THRU 200 M*	

	OIL	
51	FLASH POINT F*	
52	Sp. Gravity Deg. API*	
53	VISCOSITY AT SSU* BURNER SSF	
44	TOTAL HYDROGEN % wt	
41	Btu per lb	

	GAS	% VOL
54	CO	
55	CH_4 METHANE	
56	C_2H_2 ACETYLENE	
57	C_2H_4 ETHYLENE	
58	C_2H_6 ETHANE	
59	H_2S	
60	CO_2	
61	H_2 HYDROGEN	
	TOTAL	
	TOTAL HYDROGEN % wt	
62	DENSITY 68 F ATM. PRESS.	
63	Btu PER CU FT	
41	Btu PER LB	

64 INPUT-OUTPUT EFFICIENCY OF UNIT % $\frac{\text{ITEM 31} \times 100}{\text{ITEM 29}}$

	HEAT LOSS EFFICIENCY	Btu/lb A. F. FUEL	% of A. F. FUEL
65	HEAT LOSS DUE TO DRY GAS		
66	HEAT LOSS DUE TO MOISTURE IN FUEL		
67	HEAT LOSS DUE TO H_2O FROM COMB. OF H_2		
68	HEAT LOSS DUE TO COMBUST. IN REFUSE		
69	HEAT LOSS DUE TO RADIATION		
70	UNMEASURED LOSSES		
71	TOTAL		
72	EFFICIENCY = (100 – Item 71)		

* Not Required for Efficiency Testing

† For Point of Measurement See Par. 7.2.8.1-PTC 4.1-1964

TABLE A-2

PTC 4.1-b (1964)

ASME TEST FORM
FOR ABBREVIATED EFFICIENCY TEST

CALCULATION SHEET

Revised September, 1965

OWNER OF PLANT	TEST NO.	BOILER NO.	DATE

30 HEAT OUTPUT IN BOILER BLOW-DOWN WATER = LB OF WATER BLOW-DOWN PER HR ×

$$\left[\frac{\overset{\text{ITEM 15}}{\dots\dots} - \overset{\text{ITEM 17}}{\dots\dots}}{1000}\right] = \dots\dots\dots \ \text{kB/hr}$$

24 *If impractical to weigh refuse, this item can be estimated as follows*

$$\text{DRY REFUSE PER LB OF AS FIRED FUEL} = \frac{\text{\% ASH IN AS FIRED COAL}}{100 - \text{\% COMB. IN REFUSE SAMPLE}}$$

$$\text{CARBON BURNED PER LB AS FIRED FUEL} = \frac{\overset{\text{ITEM 43}}{\dots\dots}}{100} - \left[\frac{\overset{\text{ITEM 22}}{\dots\dots} \times \overset{\text{ITEM 23}}{\dots\dots}}{14{,}500}\right] = \dots\dots$$

NOTE: IF FLUE DUST & ASH PIT REFUSE DIFFER MATERIALLY IN COMBUSTIBLE CONTENT, THEY SHOULD BE ESTIMATED SEPARATELY. SEE SECTION 7, COMPUTATIONS.

25

$$\text{DRY GAS PER LB AS FIRED FUEL BURNED} = \frac{11CO_2 + 8O_2 + 7(N_2 + CO)}{3(CO_2 + CO)} \times \left(\text{LB CARBON BURNED PER LB AS FIRED FUEL} + \frac{3}{8}S\right)$$

$$= \frac{11 \times \overset{\text{ITEM 32}}{\dots\dots} + 8 \times \overset{\text{ITEM 33}}{\dots\dots} + 7\left(\overset{\text{ITEM 35}}{\dots\dots} + \overset{\text{ITEM 34}}{\dots\dots}\right)}{3 \times \left(\overset{\text{ITEM 32}}{\dots\dots} + \overset{\text{ITEM 34}}{\dots\dots}\right)} \times \left[\overset{\text{ITEM 24}}{\dots\dots} + \frac{\overset{\text{ITEM 47}}{\dots\dots}}{267}\right] = \dots\dots$$

36

$$\text{EXCESS AIR}\dagger = 100 \times \frac{O_2 - \frac{CO}{2}}{.2682N_2 - (O_2 - \frac{CO}{2})} = 100 \times \frac{\text{ITEM 33} - \frac{\text{ITEM 34}}{2}}{.2682\,(\text{ITEM 35}) - (\text{ITEM 33} - \frac{\text{ITEM 34}}{2})} = \dots\dots\dots$$

	HEAT LOSS EFFICIENCY	Btu/lb AS FIRED FUEL	$\frac{\text{LOSS}}{\text{HHV}} \times 100 =$	LOSS %
65	HEAT LOSS DUE TO DRY GAS = LB DRY GAS PER LB AS FIRED FUEL × C_p × $(t_{lvg} - t_{air})$ Unit = ITEM 25 ...... × 0.24 ...... (ITEM 13) − (ITEM 11) .... =	......	$\frac{65}{41} \times 100 =$	....
66	HEAT LOSS DUE TO MOISTURE IN FUEL = LB H_2O PER LB AS FIRED FUEL × [(ENTHALPY OF VAPOR AT 1 PSIA & T GAS LVG) − (ENTHALPY OF LIQUID AT T AIR)] = $\frac{\text{ITEM 37}}{100}$ × [(ENTHALPY OF VAPOR AT 1 PSIA & T ITEM 13) − (ENTHALPY OF LIQUID AT T ITEM 11)] = ...	......	$\frac{66}{41} \times 100 =$	.....
67	HEAT LOSS DUE TO H_2O FROM COMB. OF H_2 = $9H_2$ × [(ENTHALPY OF VAPOR AT 1 PSIA & T GAS LVG) − (ENTHALPY OF LIQUID AT T AIR)] = 9 × $\frac{\text{ITEM 44}}{100}$ × [(ENTHALPY OF VAPOR AT 1 PSIA & T ITEM 13) − (ENTHALPY OF LIQUID AT T ITEM 11)] = ...	......	$\frac{67}{41} \times 100 =$	.....
68	HEAT LOSS DUE TO COMBUSTIBLE IN REFUSE = ITEM 22 ...... × ITEM 23 ...... = ...	......	$\frac{68}{41} \times 100 =$	.....
69	HEAT LOSS DUE TO RADIATION* = $\frac{\text{TOTAL BTU RADIATION LOSS PER HR}}{\text{LB AS FIRED FUEL} - \text{ITEM 28}}$	......	$\frac{69}{41} \times 100 =$	.....
70	UNMEASURED LOSSES **	......	$\frac{70}{41} \times 100 =$	.....
71	TOTAL	......	......	.....
72	EFFICIENCY = (100 − ITEM 71)	......	......	.....

---

† For rigorous determination of excess air see Appendix 9.2 – PTC 4.1-1964

* If losses are not measured, use ABMA Standard Radiation Loss Chart, Fig. 8, PTC 4.1-1964

** Unmeasured losses listed in PTC 4.1 but not tabulated above may by provided for by assigning a mutually agreed upon value for Item 70.

FIGURE A-2

HP-67 KEYED CALCULATION SHEET

ASME ABBREVIATED EFFICIENCY CALCULATION - HEAT LOSS METHOD

Test No.________ Date________ Location________________ Unit No.________ Fuel________

(Turn Calculator Off and Then On. Load Program Card.)

A. FROM FUEL ANALYSIS:

Wt. % in as-fired fuel: C ________ % (A1: (STO 0)), Moisture ________ % (A2: (STO 1)), H ________ % (A3: (STO 2)), S ________ % (A4: (STO 3))

High heating value of fuel as-fired ________ Btu/lb (A5: (STO 4))

B. FROM FLUE GAS ANALYSIS:

Volume % in flue gas of: O_2 ________ % (B1: (STO 5)), CO_2 ________ % (B2: (STO 6)), CO ________ % (B3: (STO 7))

C. FROM REFUSE (FLY ASH AND ASH PIT) ANALYSIS:

C1. Fraction of dry refuse in fuel ________ lbs dry refuse/lb as-fired fuel (STO 8)

C2. Heating value of dry refuse (weighted average) ________ Btu/lb dry refuse (STO 9)

C3. Wt. % of combustibles in refuse ________ % (f P $\gtrless$ S) (STO 4) (f P $\gtrless$ S)

D. MEASURED TEMPERATURES

D1. Gas temp. leaving boiler, econ. or air heater ________ °F (STO A)

D2. Comb. air temp. ________ °F (STO B)

E. FROM STEAM TABLES:

E1. Enthalpy: $H_2O(g)$ at temp. D1 & 1 psia ________ Btu/lb (STO C)

E2. Enthalpy: $H_2O(l)$ at comb. air temp. ________ Btu/lb (STO D)

F. FROM ABMA STANDARD RADIATION LOSS CHART (UNLESS MEASURED):

F1. Heat loss due to radiation ________ % of gross heat input (STO E)

G. FROM UNIT SPECIFICATIONS (if available, otherwise enter 0):

G1. Unmeasured losses ________ % of gross heat input (f P $\gtrless$ S) (STO 0) (f P $\gtrless$ S)

---

1. Excess Air $\approx \dfrac{100\ (2B1 - B3)}{0.5364(100 - B1 - B2) - (2B1 - B3)}$ (A) ________ %

2. (Optional) Pounds dry gas per pound of fuel =

$$\frac{B1 + 4B2 + 700}{3(B2 + B3)} \times \left[\frac{A1}{100} - \frac{C1 \times C2}{14500\left(1 - \frac{C3}{100}\right)} + \frac{3A4}{800}\right]$$

(R/S) ________ lbs dry gas/lb as-fired fuel

Heat Losses	% of Gross Heat Input	(Optional) Btu/lb as-fired fuel*
3. Due to dry gas = $\dfrac{24 \times EQ.2 \times (D1 - D2)}{A5}$	(B) ________	(R/S) ________
4. Due to moisture in fuel = $\dfrac{A2 \times (E1 - E2)}{A5}$	(C) ________	(R/S) ________
5. Due to H_2O from combustion of H_2 = $\dfrac{9 \times A3(E1 - E2)}{A5}$	(D) ________	(R/S) ________
6. Due to combustibles in refuse = $\dfrac{100 \times C1 \times C2}{A5}$	(E) ________	(R/S) ________
7. Total Losses = Sum of calculated losses + F1 + G1	(f a) ________	(R/S) ________
8. Efficiency = 100 - Total Losses	(f b) ________	

*Calculated as percent of gross heat input x A5 ÷ 100

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11/7/78

APPENDIX B

DATA RECORDING FORMATS

DOCUMENTATION OF RESULTS

Field Measurements

During testing, two sets of measurements are recorded: 1) control room data which indicate the operating condition of the device and 2) emissions data that are the readouts of the individual analyzers.

The concentration of nitric oxide (NO), carbon dioxide (CO_2), carbon monoxide (CO), and oxygen (O_2) are measured and recorded. The concentration of these species are measured and displayed continuously by analyzers and strip chart recorders mounted in a console. The strip chart recordings are retained for future reference. Opacity, particulate loading, and POM concentration are measured at the sampling port and the measurements recorded on data sheets.

A number of data sheets have been developed for use in field measurements. These data sheets are listed below together with their purpose. An example of each sheet follows.

Figure No.	Title	Purpose
B-1	Thirty-Day Field Test Data Sheets	Record control room data
B-2	Gaseous Emissions Data	Record Gaseous Emissions Analyzer data
B-3	Nozzle Size, Q_m and ΔH Calculations	Calculate nozzle size, flow rate, and ΔH for Method 5 Test
B-4	Response Time for Continuous Instruments	Continuous monitor certification
B-5	Zero and Calibration Drift (24 hr)	Continuous monitor certification
B-6	Zero and Calibration Drift (2 hr)	Continuous monitor certification
B-7	Accuracy Determination (NOx)	Continuous monitor certification
B-8	Calibration Error Determination	Continuous monitor certification

Figure No.	Title	Purpose
B-9	Analysis of Calibration Gas Mixture	Continuous monitor certification
B-10	Particulate Calculation Sheet	Calculate weight of solid particulate catch
B-11	Stack Data	Record volumes, temperatures, pressures of Method 5 control unit.
B-12	Particulate Emission Caculations	Calculate particulate emmision factors
B-13	Velocity Traverse	Record temperature and velocity profile of stack
B-14	Liquid or Solid Fuel Calculation	Calculate stoichiometric properties of fuel

Figure B-1.

KVB, Inc.

THIRTY DAY FIELD TEST DATA SHEET

Site________________________ Fuel________________________

Test No.			
Date			
Time			
Load			
Test Description			
Windbox, in. H_2O			
Furnace, in. H_2O			
Overfire air, in. H_2O			
Boiler exit, in. H_2O			
Economizer exit, in. H_2O			
ID fan inlet, in. H_2O			
Steam flow, kpph			
Integrated steam flow Time/ k lbs			
Air flow indic.			
Superheater outlet temp. °F			
Flue gas temp, economizer inlet, °F			
Flue gas temp, economizer outlet, °F			
Temp F.W. economizer outlet, °F			
Feed Water Control, %			
Temp F.W. heater, °F			
F.W. economizer inlet, °F			
Steam pressure, psig			
Fuel feed			
Overfire air damper			
F.D. fan			
F.D. fan damper			
I.D. fan			
I.D. fan damper			

(continued)

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Figure B-1. (Continued)

THIRTY DAY FIELD TEST DATA SHEET

Page 2

<table>
<tr><td>Test No.</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Smoke Indicator Chart</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
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<tr><td>Spill plate setting</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Grate speed</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Overfire air damper, % open</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Fuel flow, Time/lbs</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Flame observations</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Bed thickness</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>General furnace appearance</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Clinkers</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Ambient air temp, °F & F.D. fan inlet temp.</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
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</table>

Comments:

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12/12/78
KVB 6017-1216

Figure B-2.

KVB, INC.

GASEOUS EMISSIONS DATA

Date____________

Engr.____________

Low NO_x Control Method____________

Unit No.____________ Location____________

Fuel____________ Capacity____________

Unit Type____________ Burner Type____________

1. Test No.										
2. Time										
3. Load										
4. Process Rate										
5. Flue Diam. or Size, ft										
6. Probe Position										
7. Oxygen (%)										
8. NO_x (hot) read/3% O_2 (ppm)										
9. NO (hot) read/3% O_2 (ppm)										
10. NO_2 (hot) read/3% O_2 (ppm)										
11. Carbon Dioxide (%)										
12. Carbon Monoxide (ppm) uncor/cor										
13. Opacity										
14. Atmos. Temp. (°F/°C)										
15. Dew Point Temp. (°F/°C)										
16. Atmos. Pressure (in. Hg)										
17. Relative Humidity (%)										

Data Sheet
6015-23
9/29/78

KVB 6017-1216

Figure B-3.

HP-67 Keyed Calculation Sheet

NOZZLE SIZE, Q_m and ΔH CALCULATIONS

Test No.__________ Date__________ Location__________

Unit No.__________ Fuel__________ Sampling Method__________

Crew: Engr.__________ Techs.__________

DATA

Constants		Key
Pitot Factor, F_s	______	(STO 1)
Orifice Factor, J	______	(STO 2)
Orifice Diam., D_o (in.)	______	(STO 3)
Ideal Meter Flow, Q_n (ACFM)	______	(STO 4)

Actual Conditions		Key
Meter Temperature, T_m(°F)	______	(STO 5)
Barom. Press., P_{Bar} (in. Hg)	______	(STO 6)
Static Press. Diff., ΔP_s (iwg)	______	(STO 7)
Nozzle Temp., T_n (°F)	______	(STO 8)
Stack Vel. Press., Δp (iwg)	______	(STO 9)

NOTE: TO RECALCULATE IDEAL NOZZLE SIZE, RESTORE DATA IN REGISTERS 4 THRU 8, CLEAR STACK AND RE-ENTER % H_2O, % O_2, and % CO_2

Gaseous Stack Composition			
% H_2O	(%)	______	ENTER
% O_2 dry	(%)	______	ENTER
% CO_2 dry	(%)	______	

IDEAL NOZZLE CALCULATION

(A) Ideal Nozzle Size, $D_{n(Ideal)}$ ______ inches

METER FLOW RATE AND ORIFICE PRESS. DIFF. CALCULATIONS

Actual Nozzle Size, $D_{n(Actual)}$ ______ inches

(C) Actual Meter Flow Rate, $Q_{m(Actual)}$ ______ ACFM (on meter)

(RCL 7) Orifice Press. Diff., ΔH to obtain $Q_{m(Actual)}$ ______ iwg

NOTE: To Determine Q_m and ΔH for Other Actual Nozzle Size, Key in $D_{n(Actual)}$. Press C for Q_m, then RCL 7 for ΔH.

For one $D_{n(Actual)}$ with Changing Stack Velocity Pressure (Δp) and Nozzle Temperature (T_n)
(It is not necessary to restore data in registers 4-8 for these calculations)

Δp (ENTER) (iwg)	T_n (°F)	(E) Q_m (ACFM)	(R/S) $\Delta H'$ (iwg)

EQUATIONS

(1) $M_d = 1/25\ (4\ \%\ CO_2 + \%\ O_2) + 28$ (lb/lb mole)

(2) $M_s = M_d \left(\frac{\%\ H_2O - 100}{-100}\right) + \frac{18}{100} (\%\ H_2O)$ (lb/lb mole)

(3) $P_s = 13.6\ P_{Bar} + \Delta P_s$ (in. of water)

(4) $V_n = 18892\ F_s \sqrt{[\Delta p\ (T_n + 460)]/P_s\ M_s}$ (ft/min)

(5) $Q_m = \frac{Q_{n(Ideal)}\ (T_n + 460)\ 13.6\ P_{Bar}\ [828475\ \pi^2 J^2 D_o{}^4\ (T_m + 460)]}{[1 - (\%\ H_2O/100)](T_m + 460)\ P_s [828475\ \pi^2 J^2 D_o{}^4\ (T_m + 460) - 768\ M_d\ Q^2{}_{m(Ideal)}]}$ (ACFM)

(6) $D_{n(Ideal)} = \sqrt{183.35\ (Q_n/V_n)}$ (in.)

(7) $Q_{n(Actual)} = [V_n\ D^2_{n(Actual)}]/183.35$ (ACFM)

(8) $Q_{m_i} = \frac{Q_{n(Actual)}\ (T_m + 460)(1 - \%\ H_2O/100)(13.6\ P_{Bar} + \Delta P_s)}{(T_n + 460)(13.6\ P_{Bar} + \Delta H_{i-1})}$ assume $\Delta H_o = \Delta P_s$ (ACFM)

$i = 1,n$ where n = number of iterations to obtain $\Delta H_{i\ s.t.}$ $\frac{(\Delta H_{i-1} - \Delta H_i)}{\Delta H_{i-1}} \le 0.001$

(9) $\Delta H_i = \frac{768\ Q_{m_i}{}^2\ M_d\ 13.6\ P_{Bar}}{828475\ \pi^2 J^2 D_o{}^4\ (T_m + 460) - 768\ Q_{m_i}{}^2\ M_d}$ (in. of water)

Figure B-4.

KVB

Engineer______________

MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

Date of Test ____________

Span Gas Concentration __________ppm

Analyzer Span Setting __________ppm

	1 _________seconds
Upscale	2 _________seconds
	3 _________seconds

Average upscale response ________seconds

	1 _________seconds
Downscale	2 _________seconds
	3 _________seconds

Average downscale response ________seconds.

System average response time (slower time) = ___________seconds.

% deviation from slower system average response $= \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}} \right] \times 100\% =$ ____.

Figure B-5.

KVB

Engineer______________

MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)

Zero Drift = [Mean Zero Drift* ________ + C.I. (Zero) ________]
÷ [Instrument Span] x 100 = ________.

Calibration Drift = [Mean Span Drift* ________ + C.I. (Span) ________]
÷ [Instrument Span] x 100 = ________.

*Absolute Value

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Figure B-6.

KVB

MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (2 HOUR)

Engineer________________

Data Set No.	Time		Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
	Begin	End						
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Zero Drift = [Mean Zero Drift* ________ + CI (Zero) ________] ÷ [Span] x 100 = ________.

Calibration Drift = [Mean Span Drift* ________ + CI (Span) ________] ÷ [Span] x 100 = ________.

*Absolute Value.

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Figure B-7.

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MONITOR PERFORMANCE TEST DATA SHEET

ACCURACY DETERMINATION (NO_x)

Engineer________________

Test No.	Date and Time	Reference Method Samples				Analyzer 1-Hour Average (ppm)* NO_x		Difference (ppm) NO_x	
		NO_x Sample 1 (ppm)	NO_x Sample 2 (ppm)	NO_x Sample 3 (ppm)	NO_x Sample Average (ppm)				
1									
2									
3									
4									
5									
6									
7									
8									
9									

Mean reference method test value (NO_x) ____________

Mean of the differences ____________

95% Confidence intervals = ± __________ ppm (NO_x)

$$\text{Accuracies} = \frac{\text{Mean of the differences + 95\% confidence interval}}{\text{Mean reference method value}} \times 100 = \_\_\_\_\_\_\% \ (NO_x)$$

* Explain and report method used to determine integrated averages

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Figure B-8.

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Engineer_____________

MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

Calibration Gas Mixture Data

Mid (50%) ______ppm High (90%) ______ppm

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences[1], ppm
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

	Mid	High
Mean difference	______	______
Confidence interval	± ______	± ______
Calibration error = $\frac{\text{Mean Difference}^{2} + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	______%	______%

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

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Figure B-9.

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MONITOR PERFORMANCE TEST DATA SHEET

ANALYSIS OF CALIBRATION GAS MIXTURES

Date:____________________ Reference Method Used:______

Mid-Range Calibration Gas Mixture

Sample 1 ________________ppm

Sample 2 ________________ppm

Sample 3 ________________ppm

Average ________________ppm

High-Range (span) Calibration Gas Mixture

Sample 1 ________________ppm

Sample 2 ________________ppm

Sample 3 ________________ppm

Average ________________ppm

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Figure B-10.

PARTICULATE CALCULATION SHEET

Test Crew________________

Test No.____________ Date__________ Location__________________________________

Box No._____________ Sample Probe Position______________________________________

Test Description

Dry Gas Meter Vol. (ft^3)

Final __________

Initial __________

Total __________

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final					
Initial					
Δ Vol					

Beaker No.						Filter No.	Blank No.
Date Weighed							
Tare Wt. 1							
2							
3							
4							
5							
6							
Avg							
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)							
Date Weighed or 250 Bake							
Final Wt. 250 1							
2							
3							
4							
5							
6							
Avg							
Residue wt Final 250-Tare							
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

Figure B-11.

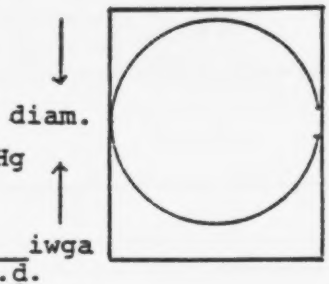
K V B. INC.

STACK DATA

Test No._____
Engr.________

Date__________ Location__________ Unit No.__________ Fuel____________
Load___________ K#/hr or MBtu/hr Filter No.________
Sample Box No._____ Meter Box No._____Probe No.____Probe Length_____

Filter Heater Setting _____
Probe Heater Setting _____
Stack Moisture _____ %
Ambient Temperature _____ °F
Nozzle Diameter _____ in.
Atmospheric Pressure _____ in.Hg
Weather ____________________
Stack Gas Pressure, Ps _____iwg
Abs. Stack Press., AP=P_s+407=____iwga
Stack Gas Sp. Gravity, Gs_____n.d.
Stack Area, As _______ft^2



Remarks

Final Meter: _______________
Initial Meter: _______________
____
____

Time	Vm Meter Volume Reading (CF)	Vacuum Gage Reading (iwg)	ΔP Pitot Tube Pressure (iwg)	H Orfice Pressure Diff (°F)	Stack Temp. (°F)	Impinger Temperature		Filter Box Temp. (°F)	Meter Temp. (°F)
						Out (°F)	In (°F)		
Total					°F				
Avg.					°F				
					+ 460				

Ts= ________ °R

60-13

11/20/75

HP-67 KEYED CALCULATION SHEET*

Figure B-12.

PARTICULATE EMISSION CALCULATIONS

Test No.__________ Date__________ Location____________________ Engr.__________

nit No.__________ Fuel__________ Sampling Train and Method ____________________

Pitot Factor, Fs .83__________ Barometric Pressure, P_{bar} __________ (STO 0) in. Hg

Tot. Liquid Collected, V_{1c} __________ (STO 1) ml Total Particulate, M_n __________ (STO 2) m gm

Velocity Head, ΔP __________ (STO 3) iwg Stack Temp., Ts __________ (STO 4) °F Stack Area, As __________ (STO 5) ft^2

Sample Volume, Vm __________ (STO 6) ft^3 Stack Press., Psg __________ (STO 7) iwg Excess O_2, XO_2% __________ (STO 8) %

Orifice Press. Diff., H __________ (STO 9) iwg, (Flue Gas Density/Air Density) @ T_s, Gs __________ (STO A) n.d.

Sample Time, θ __________ (STO B) min Nozzle Dia., Dn __________ (STO C) in. Meter Temp., T_m __________ (STO D) °F

Select Fe	Oil (A)	Gas (B)	Coal (C)	Other:
SC Feet/10^4 Btu	92.2	87.4	98.2	(D)

Press (E) if meter is not temperature compensated.

1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ __________ SCF
2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ __________ SCF
3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) __________ N.D.
4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ __________ grains/DSCF
   - b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ __________ lb/DSCF
   - c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ __________ grams/DSCM
5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ __________ in. w abs.
6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta PTs} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ __________ ft/min
7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ __________ WSCF/min
   - b. Qsd = Eq. 7a x (1. - Eq. 3) __________ DSCF/min
8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 __________ lb/hr
9. XO_2 factor $XO_2f = 2090/(20.9 - XO_2\%)$ __________ N.D.
10. Emission a. E = Eq. 4b x Fe x Eq. 9 __________ lb/MMBtu
    - b. E = Eq. 4c x Fm x Eq. 9 x 1000 __________ ng/joule
11. % Isokinetic $I = \dfrac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ __________ %

*If calculating by hand:

1) Convert T_s and T_m to °R
2) Multiply EQ 1 by $530/T_m$(°R) if meter not temperature compensated.
3) $F_m = 2.684 \times 10^{-5} \times Fe$

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Revised 9/27/78

Figure B-13.

KVB, Inc.

VELOCITY TRAVERSE

Project: ____________ Test Description: ____
Date: ____________ ____________
Location: ____________ ____________
Unit: ____________ ____________
Test: ____________ Personnel: ____________
Fuel: ____________ ____________
Barometric Press. (in. Hg): ____________
Absolute Static Press. in Stack (in. Hg): ____________ (P_s)
Pitot Tube Coefficient: ____________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_S	M_S	V_S	

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Figure B-14.

KVB

Test No.____________ Date______________ Location________________________ Unit No.________

Fuel____________________ Fuel Sample No.____________________ Fuel Sample Point________

LIQUID OR SOLID FUEL CALCULATIONS

(f)(CL REG), (f) (P≷S), (f)(CL REG), Load data card, then PGRM card (both sides)

*Input HHV (Btu/lb) ______________, (A)
*Input wt % C ______________, (R/S)
*Input wt % H ______________, (R/S)
*Input wt % S ______________, (R/S)
*Input wt % O ______________, (R/S)
*Input wt % N ______________, (R/S) - decimal point blinks after pressing; item #1 displayed

1. Dry stoichiometric moles flue gas/lb fuel = ______________.
(One may proceed to items 9, 17, or 18 by pressing (f)(A), (E), or entering MW and pressing (B), respectively.)

- -

*Input wt % H_2O in fuel (0 if none) ______________

(C) 2. Moles H_2O in flue gas/lb fuel ______________
(R/S) 3. Total moles of flue gas (stoichiometric)/lb fuel ______________
(R/S) 4. Dry volume/wet volume ______________
(R/S) 5. Volume % H_2O in flue gas ______________
(R/S) 6. Volume % CO_2, dry in flue gas ______________
(R/S) 7. SO_2 (ppm by vol.), dry at stoichiometric ______________
(R/S) 8. NO (ppm by vol.), dry at stoichiometric ______________

- -

(f)(A) 9. Stoichiometric air/fuel ratio (lb air/lb fuel) ______________

- -

(Before items 10-16 may be determined, items 1-9 must be completed.)

(D) - 20.95 displayed

*Input measured vol. % O_2 for O_2 correction ______ ______ ______ ______

(R/S) 10. $\frac{\text{Gas moles at \% } O_2}{\text{Gas moles, stoic.}} = \frac{20.95}{20.95 - \% O_2} =$ ______ ______ ______ ______
(R/S) 11. Dry moles flue gas/lb fuel at % O_2 ______ ______ ______ ______
(R/S) 12. Vol. % CO_2, dry at % O_2 ______ ______ ______ ______
(R/S) 13. SO_2 (ppm by vol.) dry at % O_2 ______ ______ ______ ______
(R/S) 14. NO (ppm by vol.) dry at % O_2 ______ ______ ______ ______
(R/S) 15. Vol. % H_2O at % O_2 ______ ______ ______ ______
(R/S) (decimal pt. blinks) 16. Percent Excess Air ______ ______ ______ ______

- -

(RCL)(2)(E) 17. Converts item 1 to SCF dry flue gas at stoich/10^6 Btu = ______________

- -

Item 18.

a. *Input MW, (B), program calculates K (lb/10^6 Btu = ppm/K)
(MW = 46 for NOx, CO = 28, HC = 16, SOx = 64)
   1. *Input measured ppm at 3% O_2, dry, (R/S), program calculates lb/10^6 Btu.
   2. (Optional) No input, (R/S), program converts lb/10^6 Btu → ng/J
   3. Repeat steps (1) and (2) as necessary.

b. *Enter next value of MW, complete step (a) followed by steps (1), (2), and (3). Repeat for all species desired.

	MW	K for lb/10^6 Btu
NOx	46	____________
CO	28	____________
HC	16	____________
SOx	64	____________

---

*Indicates input is required

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Revised 7/6/78

APPENDIX C

CONTINUOUS MONITOR CERTIFICATION DATA SHEETS

KVB

Engineer____________

MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

MAR 20 1979

Calibration Gas Mixture Data

Mid (50%) 120 ppm High (90%) 234 ppm

NOx Analyzer - Teco Series 10

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences[1], ppm
1 O	0	0	0
2 M	120	114	6
3 O	0	0	0
4 H	234	239	5
5 M	120	119	1
6 H	234	240	6
7 M	120	120	0
8 O	0	.5	.5
9 M	120	120	0
10 O	0	.5	.5
11 H	234	241	7
12 M	120	123	3
13 H	234	241	7
14 O	0	2	2
15 H	234	242	8

	Mid	High
Mean difference	2.0	6.6
Confidence interval	+3.2	+1.4
Calibration error	4.3%	3.4%

$$\text{Calibration error} = \frac{\text{Mean Difference}^{2} + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$$

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

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MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

MAR 2 0 1979

Calibration Gas Mixture Data

Mid (50%) 10% ~~ppm~~ High (90%) 17.8 % ~~ppm~~

CO_2 Analyzer - Horiba PIR 2000

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ~~ppm~~ %	Differences,[1] ~~ppm~~ %
1 O	0	0	0
2 M	10%	10%	0
3 O	0	0	0
4 H	17.8%	17.5	.3
5 M	10%	10%	0
6 H	17.8%	17.4	.4
7 M	10%	9.9	.1
8 O	0	0	0
9 M	10%	9.9	.1
10 O	0	0	0
11 H	17.8	17.4	.4
12 M	10.0	9.9	.1
13 H	17.8	17.4	.4
14 O	0	0	0
15 H	17.8	17.4	.4

	Mid	High
Mean difference	.06	.38
Confidence interval	±.07	±.20
Calibration error = $\frac{\text{Mean Difference}^2 + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	1.3 %	3.2 %

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

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Engineer ____________

MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

MAR 20 1979

Calibration Gas Mixture Data

Mid (50%) 500 ppm High (90%) 900 ppm

CO Analyzer - Horiba PIR-2000

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences,[1] ppm
1	0	0	0
2	500	490	10
3	0	0	0
4	900	900	0
5	500	485	15
6	900	900	0
7	500	480	20
8	0	0	0
9	500	475	25
10	0	0	0
11	900	890	10
12	500	485	15
13	900	890	10
14	0	0	0
15	900	890	10

	Mid	High
Mean difference	17.0	6.0
Confidence interval	+7.1	+6.2
Calibration error = $\frac{\text{Mean Difference}^{2} + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	4.8 %	1.4 %

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

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MONITOR PERFORMANCE TEST DATA SHEET

CALIBRATION ERROR DETERMINATION

MAR 20 1979

Calibration Gas Mixture Data

Mid (50%) 5.0 % ~~ppm~~ High (90%) 9.3 % ~~ppm~~

O_2 Analyzer - Beckman Model 7003

Run #		Calibration Gas Concentration, ~~ppm~~ %	Measurement System Reading, ~~ppm~~ %	Differences,[1] % ~~ppm~~
1	O	—	—	
2	M	5.0	5.2	.2
3	O	—	-	
4	H	9.3	9.2	0
5	M	5.0	5.2	.2 ✓
6	H	9.3	9.4	.1
7	M	5.0	5.2	.2 ✓
8	O	—	-	—
9	M	5.0	5.2	.2 ✓
10	O	-	-	-
11	H	9.3	9.3	0
12	M	5.0	5.1	.1 ✓
13	H	9.3	9.4	.1
14	O	0	—	—
15	H	9.3	9.4	.1

	Mid	High
Mean difference	.18	.06
Confidence interval	+.06	+.07
Calibration error = $\frac{\text{Mean Difference}^2 + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	4.8%	1.4%

---

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

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MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (2 HOUR)

Engineer__________________

NO₂ Analyzer

Data Set No.	Time Begin	Time End	Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
1 START	1000		3-15-79	0	-	234	—	—
2	1200			-2	-2	233	-1	+1
3	1400			-3	-1	230	-3	-2
4	1600			-6	-3	220	-10	-7
5	1800			-8	-2	219	-1	+1
6	2000			-9.5	-1.5	218	-1	+1.5
7 START	1000		3-16-79	0	—	234	—	—
8	1200			0	0	234	0	0
9	1400			1	1	234	0	-1
10	1600			3	2	230	-4	-6
11	1800			5	2	232	+2	0
12 START	1000		3-19-79	0	—	234	—	—
13	1200			0	0	238	+4	+4
14	1400			3.5	3.5	243	+5	+1.5
15	1600			4.5	1.0	239	-4	-5

Zero Drift = [Mean Zero Drift* 1.60 + CI (Zero) .61] ÷ [Span] x 100 = .88%.

Calibration Drift = [Mean Span Drift* 2.73 + CI (Span) [illegible]] ÷ [Span] x 100 = 1.68%.

*Absolute Value.

	1800				0	234		
START	1000		3-20-79	0	—	234	—	
	1200			3	3	238	4	1
	1400			5	2	240	2	0

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MONITOR PERFORMANCE TEST DATA SHEET

Engineer______________

ZERO AND CALIBRATION DRIFT (2 HOUR)

CO_2 Instr

Data Set No.	Time Begin	Time End	Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
1 Start	1000		3-15-79	1%	–	17.8	–	–
2	1200		3-15-79	0.9	-.01	17.8	0	-.01
3	1400		3-15-79	0.9	0	17.8	0	0
4	1600		3-15-79	0.9	0	17.8	0	0
5	1800		3-15-79	0.9	0	17.8	0	0
6	2000		3-15-79	0.9	0	17.8	0	0
7 Start	1000		3-16-79	* 0	–	17.8	–	–
8	1200		3-16-79	0	0	17.7	-.1	-.1
9	1400		3-16-79	0	0	17.6	-.1	-.1
10	1600		3-16-79	0	0	17.6	0	0
11	1800		3-16-79	0	0	17.6	0	0
12 Start	1000		3-19-79	0	–	17.8	–	–
13	1200		3-19-79	0	0	17.8	0	0
14	1400		3-19-79	0	0	17.6	-.2	-.2
15	1600		3-19-79	0	0	17.7	+.1	+.1

Zero Drift = [Mean Zero Drift* ______ + CI (Zero) ______] ÷ [Span] x 100 = 0%.

Calibration Drift = [Mean Span Drift* .04 + CI (Span) .075] ÷ [Span] x 100 = .646%

*Absolute Value.

* 10% offset by recorder

16	1800		3-19-79	0	0	17.7	0	0
17	1000		3-20-79	0	0	17.7	0	0
18	1200		3-20-79	0	0	17.7	0	0
19	1400		3-20-79	0	0	17.8	+.1	+.1

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MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (2 HOUR)

Engineer________________

CO Instrument

Cyl.#AAL 2150

Data Set No.	Time Begin	Time End	Date	Zero Reading ppm	Zero Drift (ΔZero)	Span Reading ppm	Span Drift (ΔSpan)	Calibration Drift (ΔSpan-Zero)
1 Start	1000		3-15-79	0	–	900	–	–
2	1200			0	0	896	-4	-4
3	1400			-5	-5	892	-4	
4	1600			-3	+2	895	+3	
5	1800			-3	0	897	+2	
6	2000			0	+3	902	+5	
7 Start	1000		3-16-79	0	–	900	–	–
8	1200			0	0	902	+2	
9	1400			0	0	900	-2	
10	1600			-2	-2	900	0	
11	1800			-2	0	900	0	
12 Start	1000		3-19-79	0	–	900	–	–
13	1200			-4	-4	905	+5	
14	1400			-2	+2	903	-2	
15	1600			-6	-4	900	-3	

Zero Drift = [Mean Zero Drift* 1.47 + CI (Zero) 1.[illegible]] ÷ [Span] x 100 = .124.

Calibration Drift = [Mean Span Drift* 2.53 + CI (Span) .9326] ÷ [Span] x 100 = .1731.

*Absolute Value.

	1800		3-19-79	-6	0	900	0	
Start	1000		3-20-79	0	–	900	–	
	1200			0	0	896	-4	
	1400			0	0	898	+2	

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MONITOR PERFORMANCE TEST DATA SHEET

Engineer______________

ZERO AND CALIBRATION DRIFT (2 HOUR)

O_2 Analyzer

Data Set No.	Time Begin	Time End	Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span-Zero)
1 START	1000		3/15	DNA	—	9.27	—	
2	1200					9.0	−.27	
3	1400					9.2	+.20	
4	1600					9.1	−.10	
5	1800					9.0	−.10	
6	2000					9.0	0	
7 START	1000		3/16			9.27	—	
8	1200					9.27	0	
9	1400					9.27	0	
10	1600					9.27	0	
11	1800					9.25	−.02	
12 START	1000		3/19			9.27	—	
13	1200					9.27	0	
14	1400					9.27	0	
15	1600					9.27	0	

Zero Drift = [Mean Zero Drift* ______ + CI (Zero) ______] ÷ [Span] x 100 = DNA.

Calibration Drift = [Mean Span Drift* .039 + CI (Span) .047] ÷ [Span] x 100 = 0.93%

*Absolute Value.

	1800	3/19		9.27	0
START	1000	3/20		9.27	—
	1200			9.25	.02
	1400			9.25	0

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MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

NOx Analyzer

Cylinder No. AAL-379

Date and Time		Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)
3-14-79	1000	0	–	234	–
3/15	1000	0	0	237	3
3/16	1000	2	2	236	2
[illegible]	1000	3	3	237	3
3/18	1000	0	0	235	1
3/19	1000	-2	-2	235	1
3/20	1000	-5	-5	236	2
3-21	1000	-2	-2	235	+1

Zero Drift = [Mean Zero Drift* .71 + C.I. (Zero) 1.48]
÷ [Instrument Span] x 100 = 1.68.

Calibration Drift = [Mean Span Drift* 1.86 + C.I. (Span) .832]
÷ [Instrument Span] x 100 = 1.08.

~~*Absolute Va~~lue

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MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

CO_2 Instrum.

Cyl. # AAL-1827

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)
* 3-14-79 1000	0	–	17.8 %	–
3-15-79 1000	0	0	17.8	0
3-16-79 1000	-.1	-.1	18.2	+.4
3-17-79 1000	0	0	17.8	0
3-18-79 1000	0	0	17.5	-.3
3-19-79 1000	0	0	18.2	+.4
3-20-79 1000	0	0	17.8	0
3-21-79 1000	0	0	17.8	0

Zero Drift = [Mean Zero Drift* .0014 + C.I. (Zero) .039]

÷ [Instrument Span] x 100 = .20. .04% CO2

Calibration Drift = [Mean Span Drift* .157 + C.I. (Span) .184]

÷ [Instrument Span] x 100 = 1.70. .34% CO2

*Absolute Value

* Calibrating on 0-20% Range

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MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

CO Instr

Cyl. # AAL 2150

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)
3-14-79 1000	0	–	900	—
3-15-79 "	0	0	905	+5
3-16-79 "	0	0	900	0
3-17-79 "	4	+4	907	+7
3-18-79 "	0	0	892	-8
3-19-79 "	8	+8	905	+5
3-20-79 "	0	0	908	+8
3-21-79 "	0	0	904	+4

Zero Drift = [Mean Zero Drift* 1.71 + C.I. (Zero) 2.91]
÷ [Instrument Span] x 100 = 0.23.
Calibration Drift = [Mean Span Drift* 5.29 + C.I. (Span) 2.60]
÷ [Instrument Span] x 100 = .39.
*Absolute Value

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MONITOR PERFORMANCE TEST DATA SHEET

ZERO AND CALIBRATION DRIFT (24-HOUR)

O2 Instr

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After Zero Adjustment)	Calibration Drift (ΔSpan)
3-14-79 1000	DNA		9.27	–
3/15 1000			9.25	-.02
3/16 1000			9.00	-.27
3/17 1000			9.25	-.02
3/18 1000			9.20	-.07
3/19 1000			9.27	0
3/20 1000			8.90	-.37
3-21 1000			9.30	+.03

Zero Drift = [Mean Zero Drift* ________ + C.I. (Zero) ________]
÷ [Instrument Span] x 100 = DNA.

Calibration Drift = [Mean Span Drift* .111 + C.I. (Span) .1359]
÷ [Instrument Span] x 100 = 2.47.

*Absolute Value

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MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

NO_x Analyzer

Date of Test MAR 20 1979

Span Gas Concentration ________ ppm

Analyzer Span Setting ________ ppm

Upscale	1	5.8 seconds
	2	5.1 seconds
	3	5.7 seconds
	Average upscale response	5.5 seconds
Downscale	1	5.3 seconds
	2	5.0 seconds
	3	5.0 seconds
	Average downscale response	5.1 seconds.

System average response time (slower time) = 5.5 seconds.

$$\text{% deviation from slower system average response} = \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% = 7.2\%$$

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MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

CO_2 Analyzer

Date of Test MAR 20 1979

Span Gas Concentration 17.8 ~~ppm~~ %

Analyzer Span Setting 95 ~~ppm~~ %

Upscale	1	4.6	seconds
	2	3.8	seconds
	3	4.2	seconds

Average upscale response 4.2 seconds

Downscale	1	3.8	seconds
	2	3.4	seconds
	3	4.2	seconds

Average downscale response 3.8 seconds.

System average response time (slower time) = 4.2 seconds.

$$\text{\% deviation from slower system average response} = \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% = 9.5\%$$

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MONITOR PERFORMANCE TEST DATA SHEET

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

(CJ.

Date of Test MAR 20 1979

Span Gas Concentration 900 ppm

Analyzer Span Setting 90 ppm %

Upscale	1	9.7	seconds
	2	9.3	seconds
	3	9.8	seconds

Average upscale response 9.6 seconds

Downscale	1	9.4	seconds
	2	8.2	seconds
	3	8.0	seconds

Average downscale response 8.5 seconds.

System average response time (slower time) = 8.5 seconds.

% deviation from slower system average response $= \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% =$ 13%.

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MONITOR PERFORMANCE TEST DATA SHEET

O_2 Instr.

RESPONSE TIME FOR CONTINUOUS INSTRUMENTS

Date of Test MAR 2 0 1979

Span Gas Concentration 9.3 ~~ppm~~ %

Analyzer Span Setting 9.3·25 ~~ppm~~ %

Upscale	1	10	seconds
	2	10	seconds
	3	10.2	seconds

Average upscale response 10.1 seconds

Downscale	1	9	seconds
	2	10	seconds
	3	10	seconds

Average downscale response 9.7 seconds.

System average response time (slower time) = 10.1 seconds.

$$\text{\% deviation from slower system average response} = \left[\frac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% = 4\%$$

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MONITOR PERFORMANCE TEST DATA SHEET

ACCURACY DETERMINATION (NO_x)

Engineer K.

Test No.	Date and Time	Reference Method Samples NO_x Sample 1 (ppm) @3% O₂	 NO_x Sample 2 (ppm) @3% O₂	 NO_x Sample 3 (ppm) @3% O₂	 NO_x Sample Average (ppm) @3% O₂	Analyzer 1-Hour Average (ppm)*	 NO_x @3% O₂	Difference (ppm)	 NO_x @3% O₂
1	3-19-79 10:50	198	197	201	199		190		9
2	3-19-79 11:50	197	200	202	200		192		8
3	3-19-79 12:50	197	204	197	199		199		0
4	3-19-79 13:55	—	198	201	200		193		7
5	3-19-79 14:55	191	192	192	192		201		9
6	3-19-79 15:55	196	188	188	191		214		23
7	3-19-79 16:55	187	195	208	197		188		9
8	3-19-79 17:55	194	Broken	200	197		193		4
9	3-19-79 18:55	197	191	188	192		188		4

195

Mean reference method test value (NO_x) 196

Mean of the differences 8.1

95% Confidence intervals = ± 4.92 ppm (NO_x)

$$\text{Accuracies} = \frac{\text{Mean of the differences + 95\% confidence interval}}{\text{Mean reference method value}} \times 100 = 6.64\ \%\ (NO_x)$$

* Explain and report method used to determine integrated averages

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APPENDIX D

CONTINUOUS MONITOR PERFORMANCE SPECIFICATIONS

PERFORMANCE SPECIFICATION 2—PERFORMANCE SPECIFICATIONS AND SPECIFICATION TEST PROCEDURES FOR MONITORS OF SO_2 AND NO_x FROM STATIONARY SOURCES

1. Principle and Applicability.

1.1 Principle. The concentration of sulfur dioxide or oxides of nitrogen pollutants in stack emissions is measured by a continuously operating emission measurement system. Concurrent with operation of the continuous monitoring system, the pollutant concentrations are also measured with reference methods (Appendix A). An average of the continuous monitoring system data is computed for each reference method testing period and compared to determine the relative accuracy of the continuous monitoring system. Other tests of the continuous monitoring system are also performed to determine calibration error, drift, and response characteristics of the system.

1.2 Applicability. This performance specification is applicable to evaluation of continuous monitoring systems for measurement of nitrogen oxides or sulfur dioxide pollutants. These specifications contain test procedures, installation requirements, and data computation procedures for evaluating the acceptability of the continuous monitoring systems.

2. Apparatus.

2.1 Calibration Gas Mixtures. Mixtures of known concentrations of pollutant gas in a diluent gas shall be prepared. The pollutant gas shall be sulfur dioxide or the appropriate oxide(s) of nitrogen specified by paragraph 6 and within subparts. For sulfur dioxide gas mixtures, the diluent gas may be air or nitrogen. For nitric oxide (NO) gas mixtures, the diluent gas shall be oxygen-free (<10 ppm) nitrogen, and for nitrogen dioxide (NO_2) gas mixtures the diluent gas shall be air. Concentrations of approximately 50 percent and 90 percent of span are required. The 90 percent gas mixture is used to set and to check the span and is referred to as the span gas.

2.2 Zero Gas. A gas certified by the manufacturer to contain less than 1 ppm of the pollutant gas or ambient air may be used.

2.3 Equipment for measurement of the pollutant gas concentration using the reference method specified in the applicable standard.

2.4 Data Recorder. Analog chart recorder or other suitable device with input voltage range compatible with analyzer system output. The resolution of the recorder's data output shall be sufficient to allow completion of the test procedures within this specification.

2.5 Continuous monitoring system for SO_2 or NO_x pollutants as applicable.

3. Definitions.

3.1 Continuous Monitoring System. The total equipment required for the determination of a pollutant gas concentration in a source effluent. Continuous monitoring systems consist of major subsystems as follows:

3.1.1 Sampling Interface. That portion of an extractive continuous monitoring system that performs one or more of the following operations: Acquisition, transportation, and conditioning of a sample of the source effluent or that portion of an in-situ continuous monitoring system that protects the analyzer from the effluent.

3.1.2 Analyzer. That portion of the continuous monitoring system which senses the pollutant gas and generates a signal output that is a function of the pollutant concentration.

3.1.3 Data Recorder. That portion of the continuous monitoring system that provides a permanent record of the output signal in terms of concentration units.

3.2 Span. The value of pollutant concentration at which the continuous monitoring system is set to produce the maximum data display output. The span shall be set at the concentration specified in each applicable subpart.

3.3 Accuracy (Relative). The degree of correctness with which the continuous monitoring system yields the value of gas concentration of a sample relative to the value given by a defined reference method. This accuracy is expressed in terms of error, which is the difference between the paired concentration measurements expressed as a percentage of the mean reference value.

3.4 Calibration Error. The difference between the pollutant concentration indicated by the continuous monitoring system and the known concentration of the test gas mixture.

3.5 Zero Drift. The change in the continuous monitoring system output over a stated period of time of normal continuous operation when the pollutant concentration at the time for the measurements is zero.

3.6 Calibration Drift. The change in the continuous monitoring system output over a stated time period of normal continuous operations when the pollutant concentration at the time of the measurements is the same known upscale value.

3.7 Response Time. The time interval from a step change in pollutant concentration at the input to the continuous monitoring system to the time at which 95 percent of the corresponding final value is reached as displayed on the continuous monitoring system data recorder.

3.8 Operational Period. A minimum period of time over which a measurement system is expected to operate within certain performance specifications without unscheduled maintenance, repair, or adjustment.

3.9 Stratification. A condition identified by a difference in excess of 10 percent between the average concentration in the duct or stack and the concentration at any point more than 1.0 meter from the duct or stack wall.

4. Installation Specifications. Pollutant continuous monitoring systems (SO_2 and NO_x) shall be installed at a sampling location where measurements can be made which are directly representative (4.1), or which can be corrected so as to be representative (4.2) of the total emissions from the affected

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facility. Conformance with this requirement shall be accomplished as follows:

4.1 Effluent gases may be assumed to be nonstratified if a sampling location eight or more stack diameters (equivalent diameters) downstream of any air in-leakage is selected. This assumption and data correction procedures under paragraph 4.2.1 may not be applied to sampling locations upstream of an air preheater in a steam generating facility under Subpart D of this part. For sampling locations where effluent gases are either demonstrated (4.3) or may be assumed to be nonstratified (eight diameters), a point (extractive systems) or path (in-situ systems) of average concentration may be monitored.

4.2 For sampling locations where effluent gases cannot be assumed to be nonstratified (less than eight diameters) or have been shown under paragraph 4.3 to be stratified, results obtained must be consistently representative (e.g. a point of average concentration may shift with load changes) or the data generated by sampling at a point (extractive systems) or across a path (in-situ systems) must be corrected (4.2.1 and 4.2.2) so as to be representative of the total emissions from the affected facility. Conformance with this requirement may be accomplished in either of the following ways:

4.2.1 Installation of a diluent continuous monitoring system (O_2 or CO_2 as applicable) in accordance with the procedures under paragraph 4.2 of Performance Specification 3 of this appendix. If the pollutant and diluent monitoring systems are not of the same type (both extractive or both in-situ), the extractive system must use a multipoint probe.

4.2.2 Installation of extractive pollutant monitoring systems using multipoint sampling probes or in-situ pollutant monitoring systems that sample or view emissions which are consistently representative of the total emissions for the entire cross section. The Administrator may require data to be submitted to demonstrate that the emissions sampled or viewed are consistently representative for several typical facility process operating conditions.

4.3 The owner or operator may perform a traverse to characterize any stratification of effluent gases that might exist in a stack or duct. If no stratification is present, sampling procedures under paragraph 4.1 may be applied even though the eight diameter criteria is not met.

4.4 When single point sampling probes for extractive systems are installed within the stack or duct under paragraphs 4.1 and 4.2.1, the sample may not be extracted at any point less than 1.0 meter from the stack or duct wall. Multipoint sampling probes installed under paragraph 4.2.2 may be located at any points necessary to obtain consistently representative samples.

5. Continuous Monitoring System Performance Specifications.

The continuous monitoring system shall meet the performance specifications in Table 2-1 to be considered acceptable under this method.

TABLE 2-1.—*Performance specifications*

Parameter	*Specification*
1. Accuracy [1]	≤20 pct of the mean value of the reference method test data.
2. Calibration error [1]	≤5 pct of each (50 pct, 90 pct) calibration gas mixture value.
3. Zero drift (2 h) [1]	2 pct of span
4. Zero drift (24 h) [1]	Do.
5. Calibration drift (2 h) [1]	Do.
6. Calibration drift (24 h) [1]	2.5 pct. of span
7. Response time	15 min maximum.
8. Operational period	168 h minimum.

[1] Expressed as sum of absolute mean value plus 95 pct confidence interval of a series of tests.

6. Performance Specification Test Procedures. The following test procedures shall be used to determine conformance with the requirements of paragraph 5. For NO_x analyzers that oxidize nitric oxide (NO) to nitrogen dioxide (NO_2), the response time test under paragraph 6.3 of this method shall be performed using nitric oxide (NO) span gas. Other tests for NO_x continuous monitoring systems under paragraphs 6.1 and 6.2 and all tests for sulfur dioxide systems shall be performed using the pollutant span gas specified by each subpart.

6.1 Calibration Error Test Procedure. Set up and calibrate the complete continuous monitoring system according to the manufacturer's written instructions. This may be accomplished either in the laboratory or in the field.

6.1.1 Calibration Gas Analyses. Triplicate analyses of the gas mixtures shall be performed within two weeks prior to use using Reference Methods 6 for SO_2 and 7 for NO_x. Analyze each calibration gas mixture (50%, 90%) and record the results on the example sheet shown in Figure 2-1. Each sample test result must be within 20 percent of the averaged result or the tests shall be repeated. This step may be omitted for non-extractive monitors where dynamic calibration gas mixtures are not used (6.1.2).

6.1.2 Calibration Error Test Procedure. Make a total of 15 nonconsecutive measurements by alternately using zero gas and each calibration gas mixture/concentration (e.g., 0%, 50%, 0%, 90%, 50%, 90%, 50%, 0%, etc.). ~~For nonextractive continuous monitoring systems this test procedure may be performed by using two or more calibration gas~~

cells whose concentrations are certified by the manufacturer to be functionally equivalent to these gas concentrations. Convert the continuous monitoring system output readings to ppm and record the results on the example sheet shown in Figure 2-2.

6.2 Field Test for Accuracy (Relative), Zero Drift, and Calibration Drift. Install and operate the continuous monitoring system in accordance with the manufacturer's written instructions and drawings as follows:

6.2.1 Conditioning Period. Offset the zero setting at least 10 percent of the span so that negative zero drift can be quantified. Operate the system for an initial 168-hour conditioning period in normal operating manner.

6.2.2 Operational Test Period. Operate the continuous monitoring system for an additional 168-hour period retaining the zero offset. The system shall monitor the source effluent at all times except when being zeroed, calibrated, or backpurged.

6.2.2.1 Field Test for Accuracy (Relative). For continuous monitoring systems employing extractive sampling, the probe tip for the continuous monitoring system and the probe tip for the Reference Method sampling train should be placed at adjacent locations in the duct. For NO_x continuous monitoring systems, make 27 NO_x concentration measurements, divided into nine sets, using the applicable reference method. No more than one set of tests, consisting of three individual measurements, shall be performed in any one hour. All individual measurements of each set shall be performed concurrently, or within a three-minute interval and the results averaged. For SO_2 continuous monitoring systems, make nine SO_2 concentration measurements using the applicable reference method. No more than one measurement shall be performed in any one hour. Record the reference method test data and the continuous monitoring system concentrations on the example data sheet shown in Figure 2-3.

6.2.2.2 Field Test for Zero Drift and Calibration Drift. For extractive systems, determine the values given by zero and span gas pollutant concentrations at two-hour intervals until 15 sets of data are obtained. ~~For nonextractive measurement systems, the zero value may be determined by mechanically producing a zero condition that provides a system check of the analyzer internal mirrors and all electronic circuitry including the radiation source and detector assembly or by inserting three or more calibration gas cells and computing the zero point from the upscale measurements. If this latter technique is used, a graph(s) must be retained by the owner or operator for each measurement system that shows the relationship between the upscale measurements and the zero point. The span of the system shall be checked by using a calibration gas cell certified by the manufacturer to be functionally equivalent to 50 percent of span concentration.~~ Record the zero and span measurements (or the computed zero drift) on the example data sheet shown in Figure 2-4. The two-hour periods over which measurements are conducted need not be consecutive but may not overlap. All measurements required under this paragraph may be conducted concurrent with tests under paragraph 6.2.2.1.

6.2.2.3 Adjustments. Zero and calibration corrections and adjustments are allowed only at 24-hour intervals or at such shorter intervals as the manufacturer's written instructions specify. Automatic corrections made by the measurement system without operator intervention or initiation are allowable at any time. During the entire 168-hour operational test period, record on the example sheet shown in Figure 2-5 the values given by zero and span gas pollutant concentrations before and after adjustment at 24-hour intervals.

6.3 Field Test for Response Time.

6.3.1 Scope of Test. Use the entire continuous monitoring system as installed, including sample transport lines if used. Flow rates, line diameters, pumping rates, pressures (do not allow the pressurized calibration gas to change the normal operating pressure in the sample line), etc., shall be at the nominal values for normal operation as specified in the manufacturer's written instructions. If the analyzer is used to sample more than one pollutant source (stack), repeat this test for each sampling point.

6.3.2 Response Time Test Procedure. Introduce zero gas into the continuous monitoring system sampling interface or as close to the sampling interface as possible. When the system output reading has stabilized, switch quickly to a known concentration of pollutant gas. Record the time from concentration switching to 95 percent of final stable response. For non-extractive monitors, the highest available calibration gas concentration shall be switched into and out of the sample path and response times recorded. Perform this test sequence three (3) times. Record the results of each test on the example sheet shown in Figure 2-6.

7. Calculations, Data Analysis and Reporting.

7.1 Procedure for determination of mean values and confidence intervals.

7.1.1 The mean value of a data set is calculated according to equation 2-1.

$$\bar{x}=\frac{1}{n}\sum_{i=1}^{n} x_i \qquad \text{Equation 2-1}$$

where:

x_i = absolute value of the measurements,
Σ = sum of the individual values,
$\bar{x}$ = mean value, and
n = number of data points.

7.1.2 The 95 percent confidence interval (two-sided) is calculated according to equation 2-2:

$$C.I._{95}=\frac{t_{.975}}{n\sqrt{n-1}}\sqrt{n(\Sigma x_i^2)-(\Sigma x_i)^2} \qquad \text{Equation 2-2}$$

where:

$\sum x_i$ = sum of all data points,
$t_{.975} = t_1 - \alpha/2$, and
$C.I._{95}$ = 95 percent confidence interval estimate of the average mean value.

Values for $t_{.975}$

n	$t_{.975}$
2	12.706
3	4.303
4	3.182
5	2.776
6	2.571
7	2.447
8	2.365
9	2.306
10	2.262
11	2.228
12	2.201
13	2.179
14	2.160
15	2.145
16	2.131

The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of samples as data points.

7.2 Data Analysis and Reporting.

7.2.1 Accuracy (Relative). For each of the nine reference method test points, determine the average pollutant concentration reported by the continuous monitoring system. These average concentrations shall be determined from the continuous monitoring system data recorded under 7.2.2 by integrating or averaging the pollutant concentrations over each of the time intervals concurrent with each reference method testing period. Before proceeding to the next step, determine the basis (wet or dry) of the continuous monitoring system data and reference method test data concentrations. If the bases are not consistent, apply a moisture correction to either reference method concentrations or the continuous monitoring system concentrations as appropriate. Determine the correction factor by moisture tests concurrent with the reference method testing periods. Report the moisture test method and the correction procedure employed. For each of the nine test runs determine the difference for each test run by subtracting the respective reference method test concentrations (use average of each set of three measurements for NO_x) from the continuous monitoring system integrated or averaged concentrations. Using these data, compute the mean difference and the 95 percent confidence interval of the differences (equations 2-1 and 2-2). Accuracy is reported as the sum of the absolute value of the mean difference and the 95 percent confidence interval of the differences expressed as a percentage of the mean reference method value. Use the example sheet shown in Figure 2-3.

7.2.2 Calibration Error. Using the data from paragraph 6.1, subtract the measured pollutant concentration determined under paragraph 6.1.1 (Figure 2-1) from the value shown by the continuous monitoring system for each of the five readings at each concentration measured under 6.1.2 (Figure 2-2). Calculate the mean of these difference values and the 95 percent confidence intervals according to equations 2-1 and 2-2. Report the calibration error (the sum of the absolute value of the mean difference and the 95 percent confidence interval) as a percentage of each respective calibration gas concentration. Use example sheet shown in Figure 2-2.

7.2.3 Zero Drift (2-hour). Using the zero concentration values measured each two hours during the field test, calculate the differences between consecutive two-hour readings expressed in ppm. Calculate the mean difference and the confidence interval using equations 2-1 and 2-2. Report the zero drift as the sum of the absolute mean value and the confidence interval as a percentage of span. Use example sheet shown in Figure 2-4.

7.2.4 Zero Drift (24-hour). Using the zero concentration values measured every 24 hours during the field test, calculate the differences between the zero point after zero adjustment and the zero value 24 hours later just prior to zero adjustment. Calculate the mean value of these points and the confidence interval using equations 2-1 and 2-2. Report the zero drift (the sum of the absolute mean and confidence interval) as a percentage of span. Use example sheet shown in Figure 2-5.

7.2.5 Calibration Drift (2-hour). Using the calibration values obtained at two-hour intervals during the field test, calculate the differences between consecutive two-hour readings expressed as ppm. These values should be corrected for the corresponding zero drift during that two-hour period. Calculate the mean and confidence interval of these corrected difference values using equations 2-1 and 2-2. Do not use the differences between non-consecutive readings. Report the calibration drift as the sum of the absolute mean and confidence interval as a percentage of span. Use example sheet shown in in Figure 2-4.

7.2.6 Calibration Drift (24-hour). Using the calibration values measured every 24 hours during the field test, calculate the differences between the calibration concentration reading after zero and calibration adjustment, and the calibration concentration reading 24 hours later after zero adjustment but before calibration adjustment. Calculate the mean value of these differences and the confidence interval using equations 2-1 and 2-2. Report the calibration drift (the sum of the absolute mean and confidence interval) as a percentage of span. Use the example sheet shown in Figure 2-5.

7.2.7 Response Time. Using the charts from paragraph 6.3, calculate the time interval from concentration switching to 95 percent to the final stable value for all upscale and downscale tests. Report the mean of the three upscale test times and the mean of the three downscale test times. The two average times should not differ by more than 15 percent of the slower time. Report the slower time as the system response time. Use the example sheet shown in Figure 2-6.

7.2.8 Operational Test Period. During the 168-hour performance and operational test period, the continuous monitoring system shall not require any corrective maintenance, repair, replacement, or adjustment other than that clearly specified as required in the operation and maintenance manuals as routine and expected during a one-week period. If the continuous monitoring system operates within the specified performance parameters and does not require corrective maintenance, repair, replacement or adjustment other than as specified above during the 168-hour test period, the operational period will be successfully concluded. Failure of the continuous monitoring system to meet this requirement shall call for a repetition of the 168-hour test period. Portions of the test which were satisfactorily completed need not be repeated. Failure to meet any performance specifications shall call for a repetition of the one-week performance test period and that portion of the testing which is related to the failed specification. All maintenance and adjustments required shall be recorded. Output readings shall be recorded before and after all adjustments.

8. References.

8.1 "Monitoring Instrumentation for the Measurement of Sulfur Dioxide in Stationary Source Emissions," Environmental Protection Agency, Research Triangle Park, N.C., February 1973.

8.2 "Instrumentation for the Determination of Nitrogen Oxides Content of Stationary Source Emissions," Environmental Protection Agency, Research Triangle Park, N.C., Volume 1, APTD-0847, October 1971; Volume 2, APTD-0942, January 1972.

8.3 "Experimental Statistics," Department of Commerce, Handbook 91, 1963, pp. 3-31, paragraphs 3-3.1.4.

8.4 "Performance Specifications for Stationary-Source Monitoring Systems for Gases and Visible Emissions," Environmental Protection Agency, Research Triangle Park, N.C., EPA-650/2-74-013, January 1974.

Date ______________ Reference Method Used ____

Mid-Range Calibration Gas Mixture

Sample 1 ________ ppm
Sample 2 ________ ppm
Sample 3 ________ ppm
Average ________ ppm

High-Range (span) Calibration Gas Mixture

Sample 1 ________ ppm
Sample 2 ________ ppm
Sample 3 ________ ppm
Average ________ ppm

Figure 2-1. Analysis of Calibration Gas Mixtures

Monitor Performance Test Data Sheet

Calibration Gas Mixture Data (From Figure 2-1)

Mid (50%) _____ppm High (90%) _____ppm

Run #	Calibration Gas Concentration, ppm	Measurement System Reading, ppm	Differences,[1] ppm
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

	Mid	High
Mean difference	____	____
Confidence interval	± ____	± ____
Calibration error = $\frac{\text{Mean Difference}^2 + \text{C.I.}}{\text{Average Calibration Gas Concentration}} \times 100$	____%	____%

[1] Calibration gas concentration - measurement system reading

[2] Absolute value

Figure 2-2. Calibration Error Determination

Test No.	Date and Time	Reference Method Samples					Analyzer 1-Hour Average (ppm)*		Difference (ppm)	
		SO_2 Sample 1 (ppm)	NO Sample 1 (ppm)	NO Sample 2 (ppm)	NO Sample 3 (ppm)	NO_x Sample Average (ppm)	SO_2	NO_x	SO_2	NO_x
1										
2										
3										
4										
5										
6										
7										
8										
9										

Mean reference method test value (SO_2) ____

Mean reference method test value (NO_x) ____

Mean of the differences ____

95% Confidence intervals = ± ____ ppm (SO_2) = ± ____ ppm (NO_x)

Accuracies = $\frac{\text{Mean of the differences + 95\% confidence interval}}{\text{Mean reference method value}}$ x 100 = ____% (SO_2) = ____% (NO_x)

* Explain and report method used to determine integrated averages

Figure 2-3. Accuracy Determination (SO_2 and NO_x)

Data Set No.	Time Begin	Time End	Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift (Span- Zero)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Zero Drift = [Mean Zero Drift* ____ + CI (Zero) ____] ÷ [Span] x 100 = ____.

Calibration Drift = [Mean Span Drift* ____ + CI (Span) ____] ÷ [Span] x 100 = ____.

*Absolute Value.

Figure 2-4. Zero and Calibration Drift (2 Hour)

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After zero adjustment)	Calibration Drift (ΔSpan)

Zero Drift = [Mean Zero Drift* ______ + C.I. (Zero) ______]

÷ [Instrument Span] x 100 = ______.

Calibration Drift = [Mean Span Drift* ______ + C.I. (Span) ______]

÷ [Instrument Span] x 100 = ______.

* Absolute value

Figure 2-5. Zero and Calibration Drift (24-hour)

Date of Test ____________

Span Gas Concentration ________ppm

Analyzer Span Setting ________ppm

Upscale
1 ________seconds
2 ________seconds
3 ________seconds

Average upscale response ________seconds

Downscale
1 ________seconds
2 ________seconds
3 ________seconds

Average downscale response ______seconds

System average response time (slower time) = _______seconds.

%deviation from slower system average response = $\left[\dfrac{\text{average upscale minus average downscale}}{\text{slower time}}\right] \times 100\% =$ ____.

CO_2 & O_2

Figure 2-6. Response Time

Performance Specification 3—Performance specifications and specification test procedures for monitors of CO_2 and O_2 from stationary sources.

1. Principle and Applicability.

1.1 Principle. Effluent gases are continuously sampled and are analyzed for carbon dioxide or oxygen by a continuous monitoring system. Tests of the system are performed during a minimum operating period to determine zero drift, calibration drift, and response time characteristics.

1.2 Applicability. This performance specification is applicable to evaluation of continuous monitoring systems for measurement of carbon dioxide or oxygen. These specifications contain test procedures, installation requirements, and data computation procedures for evaluating the acceptability of the continuous monitoring systems subject to approval by the Administrator. Sampling may include either extractive or non-extractive (in-situ) procedures.

2. Apparatus.

2.1 Continuous Monitoring System for Carbon Dioxide or Oxygen.

2.2 Calibration Gas Mixtures. Mixture of known concentrations of carbon dioxide or oxygen in nitrogen or air. Midrange and 90 percent of span carbon dioxide or oxygen concentrations are required. The 90 percent of span gas mixture is to be used to set and check the analyzer span and is referred to as span gas. For oxygen analyzers, if the span is higher than 21 percent O_2, ambient air may be used in place of the 90 percent of span calibration gas mixture. Triplicate analyses of the gas mixture (except ambient air) shall be performed within two weeks prior to use using Reference Method 3 of this part.

2.3 Zero Gas. A gas containing less than 100 ppm of carbon dioxide or oxygen.

2.4 Data Recorder. Analog chart recorder or other suitable device with input voltage range compatible with analyzer system output. The resolution of the recorder's data output shall be sufficient to allow completion of the test procedures within this specification.

3. Definitions.

3.1 Continuous Monitoring System. The total equipment required for the determination of carbon dioxide or oxygen in a given source effluent. The system consists of three major subsystems:

3.1.1 Sampling Interface. That portion of the continuous monitoring system that performs one or more of the following operations: Delineation, acquisition, transportation, and conditioning of a sample of the source effluent or protection of the analyzer from the hostile aspects of the sample or source environment.

3.1.2 Analyzer. That portion of the continuous monitoring system which senses the pollutant gas and generates a signal output that is a function of the pollutant concentration.

3.1.3 Data Recorder. That portion of the continuous monitoring system that provides a permanent record of the output signal in terms of concentration units.

3.2 Span. The value of oxygen or carbon dioxide concentration at which the continuous monitoring system is set that produces the maximum data display output. For the purposes of this method, the span shall be set no less than 1.5 to 2.5 times the normal carbon dioxide or normal oxygen concentration in the stack gas of the affected facility.

3.3 Midrange. The value of oxygen or carbon dioxide concentration that is representative of the normal conditions in the stack gas of the affected facility at typical operating rates.

3.4 Zero Drift. The change in the continuous monitoring system output over a stated period of time of normal continuous operation when the carbon dioxide or oxygen concentration at the time for the measurements is zero.

3.5 Calibration Drift. The change in the continuous monitoring system output over a stated time period of normal continuous operation when the carbon dioxide or oxygen continuous monitoring system is measuring the concentration of span gas.

3.6 Operational Test Period. A minimum period of time over which the continuous monitoring system is expected to operate within certain performance specifications without unscheduled maintenance, repair, or adjustment.

3.7 Response time. The time interval from a step change in concentration at the input to the continuous monitoring system to the time at which 95 percent of the corresponding final value is displayed on the continuous monitoring system data recorder.

4. Installation Specification.

Oxygen or carbon dioxide continuous monitoring systems shall be installed at a location where measurements are directly representative of the total effluent from the affected facility or representative of the same effluent sampled by a SO_2 or NO_x continuous monitoring system. This requirement shall be complied with by use of applicable requirements in Performance Specification 2 of this appendix as follows:

4.1 Installation of Oxygen or Carbon Dioxide Continuous Monitoring Systems Not Used to Convert Pollutant Data. A sampling location shall be selected in accordance with the procedures under paragraphs 4.2.1 or 4.2.2, or Performance Specification 2 of this appendix.

4.2 Installation of Oxygen or Carbon Dioxide Continuous Monitoring Systems Used to Convert Pollutant Continuous Monitoring System Data to Units of Applicable Standards. The diluent continuous monitoring system (oxygen or carbon dioxide) shall be installed at a sampling location where measurements that can be made are representative of the effluent gases sampled by the pollutant continuous monitoring system(s). Conformance with this requirement may be accomplished in any of the following ways:

4.2.1 The sampling location for the diluent system shall be near the sampling location for the pollutant continuous monitoring system such that the same approximate point(s) (extractive systems) or path (in-situ systems) in the cross section is sampled or viewed.

4.2.2 The diluent and pollutant continuous monitoring systems may be installed at different locations if the effluent gases at both sampling locations are nonstratified as determined under paragraphs 4.1 or 4.2, Performance Specification 2 of this appendix and there is no in-leakage occurring between the two sampling locations. If the effluent gases are stratified at either location, the procedures under paragraph 4.2.2, Performance Specification 2 of this appendix shall be used for installing continuous monitoring systems at that location.

5. Continuous Monitoring System Performance Specifications.

The continuous monitoring system shall meet the performance specifications in Table 3–1 to be considered acceptable under this method.

6. Performance Specification Test Procedures.

The following test procedures shall be used to determine conformance with the requirements of paragraph 4. Due to the wide variation existing in analyzer designs and principles of operation, these procedures are not applicable to all analyzers. Where this occurs, alternative procedures, subject to the approval of the Administrator, may be employed. Any such alternative procedures must fulfill the same purposes (verify response, drift, and accuracy) as the following procedures, and must clearly demonstrate conformance with specifications in Table 3–1.

6.1 Calibration Check. Establish a calibration curve for the continuous monitoring system using zero, midrange, and span concentration gas mixtures. Verify that the resultant curve of analyzer reading compared with the calibration gas value is consistent with the expected response curve as described by the analyzer manufacturer. If the expected response curve is not produced, additional calibration gas measurements shall be made, or additional steps undertaken to verify the accuracy of the response curve of the analyzer.

6.2 Field Test for Zero Drift and Calibration Drift. Install and operate the continuous monitoring system in accordance with the manufacturer's written instructions and drawings as follows:

TABLE 3-1.—*Performance specifications*

Parameter	*Specification*
1. Zero drift (2 h) [1]	≤0.4 pct O_2 or CO_2.
2. Zero drift (24 h) [1]	≤0.5 pct O_2 or CO_2.
3. Calibration drift (2 h) [1]	≤0.4 pct O_2 or CO_2.
4. Calibration drift (24 h) [1]	≤0.5 pct O_2 or CO_2.
5. Operational period	168 h minimum.
6. Response time	10 min.

[1] Expressed as sum of absolute mean value plus 95 pct confidence interval of a series of tests.

6.2.1 Conditioning Period. Offset the zero setting at least 10 percent of span so that negative zero drift may be quantified. Operate the continuous monitoring system for an initial 168-hour conditioning period in a normal operational manner.

6.2.2. Operational Test Period. Operate the continuous monitoring system for an additional 168-hour period maintaining the zero offset. The system shall monitor the source effluent at all times except when being zeroed, calibrated, or backpurged.

6.2.3 Field Test for Zero Drift and Calibration Drift. Determine the values given by zero and midrange gas concentrations at two-hour intervals until 15 sets of data are obtained. For non-extractive continuous monitoring systems, determine the zero value given by a mechanically produced zero condition or by computing the zero value from upscale measurements using calibrated gas cells certified by the manufacturer. The midrange checks shall be performed by using certified calibration gas cells functionally equivalent to less than 50 percent of span. Record these readings on the example sheet shown in Figure 3-1. These two-hour periods need not be consecutive but may not overlap. In-situ CO_2 or O_2 analyzers which cannot be fitted with a calibration gas cell may be calibrated by alternative procedures acceptable to the Administrator. Zero and calibration corrections and adjustments are allowed only at 24-hour intervals or at such shorter intervals as the manufacturer's written instructions specify. Automatic corrections made by the continuous monitoring system without operator intervention or initiation are allowable at any time. During the entire 168-hour test period, record the values given by zero and span gas concentrations before and after adjustment at 24-hour intervals in the example sheet shown in Figure 3-2.

6.3 Field Test for Response Time.

6.3.1 Scope of Test.

This test shall be accomplished using the continuous monitoring system as installed, including sample transport lines if used. Flow rates, line diameters, pumping rates, pressures (do not allow the pressurized calibration gas to change the normal operating pressure in the sample line), etc., shall be at the nominal values for normal operation as specified in the manufacturer's written instructions. If the analyzer is used to sample more than one source (stack), this test shall be repeated for each sampling point.

6.3.2 Response Time Test Procedure.

Introduce zero gas into the continuous monitoring system sampling interface or as close to the sampling interface as possible. When the system output reading has stabilized, switch quickly to a known concentration of gas at 90 percent of span. Record the time from concentration switching to 95 percent of final stable response. After the system response has stabilized at the upper level, switch quickly to a zero gas. Record the time from concentration switching to 95 percent of final stable response. Alternatively, for nonextractive continuous monitoring systems, the highest available calibration gas concentration shall be switched into and out of the sample path and response times recorded. Perform this test sequence three (3) times. For each test, record the results on the data sheet shown in Figure 3-3.

7. Calculations, Data Analysis, and Reporting.

7.1 Procedure for determination of mean values and confidence intervals.

7.1.1 The mean value of a data set is calculated according to equation 3-1.

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i \qquad \text{Equation 3-1}$$

where:

x_i = absolute value of the measurements,
Σ = sum of the individual values,
$\bar{x}$ = mean value, and
n = number of data points.

7.2.1 The 95 percent confidence interval (two-sided) is calculated according to equation 3-2:

$$C.I._{95} = \frac{t_{.975}}{n\sqrt{n-1}} \sqrt{n(\sum x_i^2) - (\sum x_i)^2} \qquad \text{Equation 3-2}$$

where:

ΣX = sum of all data points,
$t_{.975} = t_1 - \alpha/2$, and
$C.I._{95}$ = 95 percent confidence interval estimates of the average mean value.

Values for $t_{.975}$

n	$t_{.975}$
2	12.706
3	4.303
4	3.182
5	2.776
6	2.571
7	2.447
8	2.365
9	2.306
10	2.262
11	2.228
12	2.201
13	2.179
14	2.160
15	2.145
16	2.131

The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of samples as data points.

7.2 Data Analysis and Reporting.

7.2.1 Zero Drift (2-hour). Using the zero concentration values measured each two hours during the field test, calculate the differences between the consecutive two-hour readings expressed in ppm. Calculate the mean difference and the confidence interval using equations 3-1 and 3-2. Record the sum of the absolute mean value and the confidence interval on the data sheet shown in Figure 3-1.

7.2.2 Zero Drift (24-hour). Using the zero concentration values measured every 24 hours during the field test, calculate the differences between the zero point after zero adjustment and the zero value 24 hours later just prior to zero adjustment. Calculate the mean value of these points and the confidence interval using equations 3-1 and 3-2. Record the zero drift (the sum of the absolute mean and confidence interval) on the data sheet shown in Figure 3-2.

7.2.3 Calibration Drift (2-hour). Using the calibration values obtained at two-hour intervals during the field test, calculate the differences between consecutive two-hour readings expressed as ppm. These values should be corrected for the corresponding zero drift during that two-hour period. Calculate the mean and confidence interval of these corrected difference values using equations 3-1 and 3-2. Do not use the differences between non-consecutive readings. Record the sum of the absolute mean and confidence interval upon the data sheet shown in Figure 3-1.

7.2.4 Calibration Drift (24-hour). Using the calibration values measured every 24 hours during the field test, calculate the differences between the calibration concentration reading after zero and calibration adjustment and the calibration concentration reading 24 hours later after zero adjustment but before calibration adjustment. Calculate the mean value of these differences and the confidence interval using equations 3-1 and 3-2. Record the sum of the absolute mean and confidence interval on the data sheet shown in Figure 3-2.

7.2.5 Operational Test Period. During the 168-hour performance and operational test period, the continuous monitoring system shall not receive any corrective maintenance, repair, replacement, or adjustment other than that clearly specified as required in the manufacturer's written operation and maintenance manuals as routine and expected during a one-week period. If the continuous monitoring system operates within the specified performance parameters and does not require corrective maintenance, repair, replacement or adjustment other than as specified above during the 168-hour test period, the operational period will be successfully concluded. Failure of the continuous monitoring system to meet this requirement shall call for a repetition of the 168 hour test period. Portions of the test which were satisfactorily completed need not be repeated. Failure to meet any performance specifications shall call for a repetition of the one-week performance test period and that portion of the testing which is related to the failed specification. All maintenance and adjustments required shall be recorded. Output readings shall be recorded before and after all adjustments.

7.2.6 Response Time. Using the data developed under paragraph 6.3, calculate the time interval from concentration switching to 95 percent to the final stable value for all upscale and downscale tests. Report the mean of the three upscale test times and the mean of the three downscale test times. The two average times should not differ by more than 15 percent of the slower time. Report the slower time as the system response time. Record the results on Figure 3-3.

8. References.

8.1 "Performance Specifications for Stationary Source Monitoring Systems for Gases and Visible Emissions," Environmental Protection Agency, Research Triangle Park, N.C., EPA-650/2-74-013, January 1974.

8.2 "Experimental Statistics," Department of Commerce, National Bureau of Standards Handbook 91, 1963, pp. 3-31, paragraphs 3-3.1.4.

Data Set No.	Time		Date	Zero Reading	Zero Drift (ΔZero)	Span Reading	Span Drift (ΔSpan)	Calibration Drift [ΔSpan-ΔZero)
	Begin	End						
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Zero Drift = [Mean Zero Drift* ________ + CI (Zero) ________] = ________.

Calibration Drift = [Mean Span Drift* ______ + CI (Span ________] = ________.

*Absolute Value.

Figure 3-1. Zero and Calibration Drift (2 Hour).

Date and Time	Zero Reading	Zero Drift (ΔZero)	Span Reading (After zero adjustment)	Calibration Drift (ΔSpan)

Zero Drift = [Mean Zero Drift* _______ + C.I. (Zero) _______]

= ________.

Calibration Drift = [Mean Span Drift* ________ + C.I. (Span) ________]

= ________.

* Absolute value

Figure 3-2. Zero and Calibration Drift (24-hour)

Date of Test ____________

Span Gas Concentration ________ ppm

Analyzer Span Setting ________ ppm

Upscale
1. ________ seconds
2. ________ seconds
3. ________ seconds

Average upscale response ________ seconds

Downscale
1. ________ seconds
2. ________ seconds
3. ________ seconds

Average downscale response ________ seconds

System average response time (slower time) = ________ seconds

% deviation from slower system average response = $\frac{\text{average upscale minus average downscale}}{\text{slower time}}$ x 100%

= __________.

Figure 3-3. Response

[40 FR 46259, Oct. 6, 1975; 40 FR 59204, 59205, Dec. 22, 1975, as amended at 42 FR 5937, Jan. 31, 1977]

APPENDIX C—DETERMINATION OF EMISSION RATE CHANGE

1. *Introduction.*

1.1 The following method shall be used to determine whether a physical or operational change to an existing facility resulted in an increase in the emission rate to the atmosphere. The method used is the Student's *t* test, commonly used to make inferences from small samples.

2. *Data.*

2.1 Each emission test shall consist of *n* runs (usually three) which produce *n* emission rates. Thus two sets of emission rates are generated, one before and one after the change, the two sets being of equal size.

2.2 When using manual emission tests, except as provided in § 60.8(b) of this part, the reference methods of Appendix A to this part shall be used in accordance with the procedures specified in the applicable subpart both before and after the change to obtain the data.

2.3 When using continuous monitors, the facility shall be operated as if a manual emission test were being performed. Valid data using the averaging time which would be required if a manual emission test were being conducted shall be used.

3. *Procedure.*

3.1 Subscripts a and b denote prechange and postchange respectively.

3.2 Calculate the arithmetic mean emission rate, $\bar{E}$, for each set of data using Equation 1.

$$\bar{E}=\frac{\sum_{i=1}^{n} E_i}{n}=\frac{E_1+E_2\ldots+E_n}{n} \qquad (1)$$

where:

E_i=Emission rate for the *i* th run.

n=number of runs

3.3 Calculate the sample variance, S^2, for each set of data using Equation 2.

$$S^2=\frac{\sum_{i=1}^{n}(E_i-\bar{E})^2}{n-1}=\frac{\sum_{i=1}^{n}E_i^2-\left(\sum_{i=1}^{n}E_i\right)^2\Big/n}{n-1} \qquad (2)$$

3.4 Calculate the pooled estimate, S_p, using Equation 3.

$$S_p=\left[\frac{(n_a-1)\,S_a^2+(n_b-1)\,S_b^2}{n_a+n_b-2}\right]^{1/2} \qquad (3)$$

3.5 Calculate the test statistic, *t*, using Equation 4.

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APPENDIX E

SUMMARY OF PREVIOUS DATA FROM SITE 2

Location No. 18, Test No. 9

Boiler No. 2 at Location 18 is a Babcock and Wilcox integral furnace watertube boiler with a rated capacity of 90,000 lbs/hr steam flow and was installed in 1935. The current top load capability is 79,000 lbs/hr steam flow and is limited by the fans. The furnace wall consists of watertubes approximately 3 inches in diameter spaced 10.25 inches on centers. The wall exposure between the tubes consists of refractory; the furnace was rebricked in 1972. The boiler operates at a nominal steam pressure of 320 psig and steam temperature of 428°F (saturation).

Three B&W steam-atomized burners are spaced in a triangular pattern, with the top burner spaced directly above the center position of the lower two burners. The vertical spacing (height of the triangle) is 36 inches, and the horizontal spacing (base of the triangle) is 37 inches. The oil guns use a B&W Y-jet steam atomizer with the steam pressure at the burner nominally 35 psi greater than the oil pressure. No. 6 fuel oil was used for this test. The temperature of the oil at the burner varied from 185°F at the lower loads to 208°F at top load. The oil pressure at the burner at top load was 85 psig. A tubular type preheater is used to preheat the combustion air; however, no air temperature data were available during this test.

The furnace volume and area loading, i.e., ft^3/MBtu/hr and ft^2/MBtu/hr, and burner loading are all about average for boilers of this capacity.

The NO_x emissions and excess O_2 levels as a function of boiler steam flow are presented in Figure E-1. Although the O_2 levels are high over the entire load range investigated, there is not the sharp increase in O_2 at lower loads which has typically caused the emissions from other boilers to increase at lower loads. This practice of holding the excess oxygen relatively constant over the load range is unique to location 18 boilers and is followed consistently at most facilities of the same company.

Maximum NO_x levels were found to occur at baseline to top load operating conditions. The effect of excess O_2 on NO_x emissions is presented in Figure E-2 and shows a relatively strong effect, especially for the high operating excess

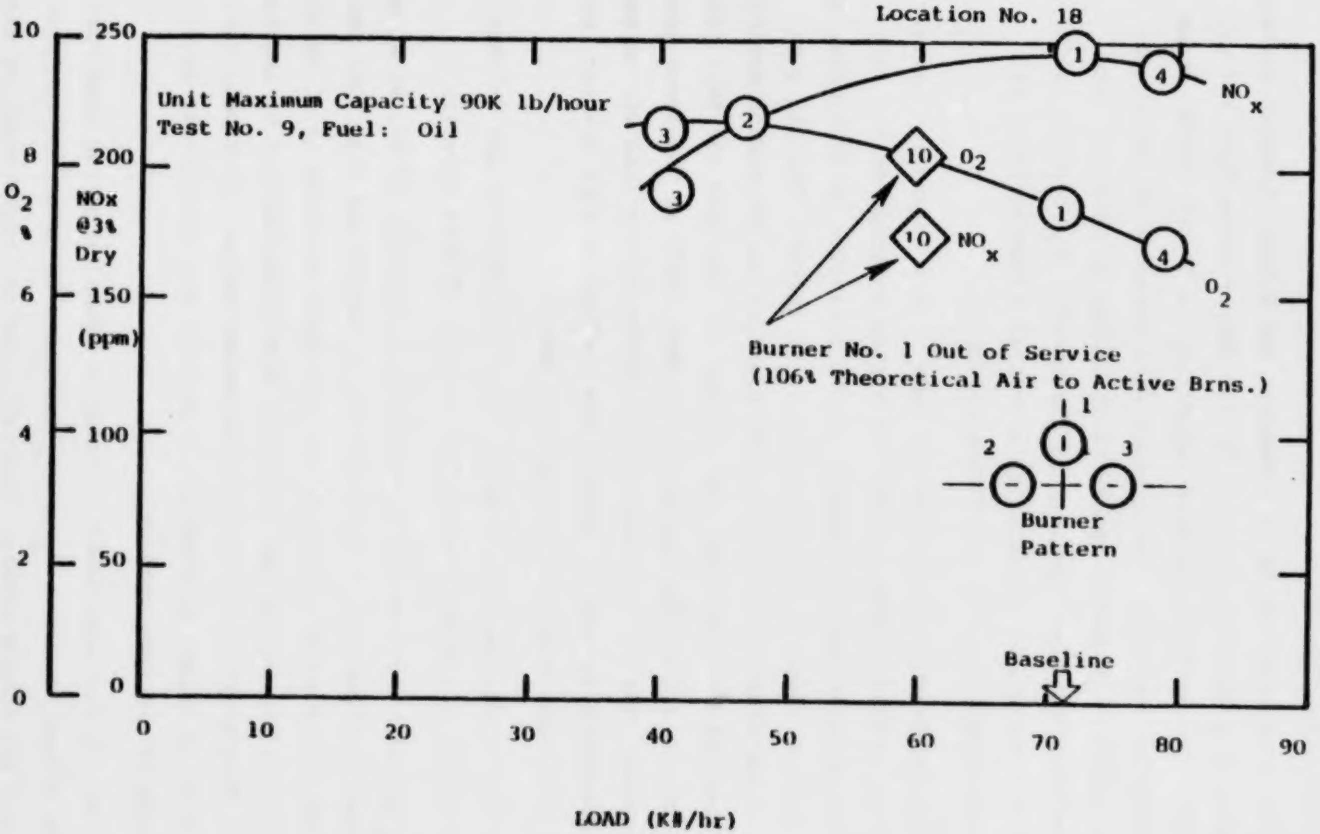

Figure E-1. Effect of Load

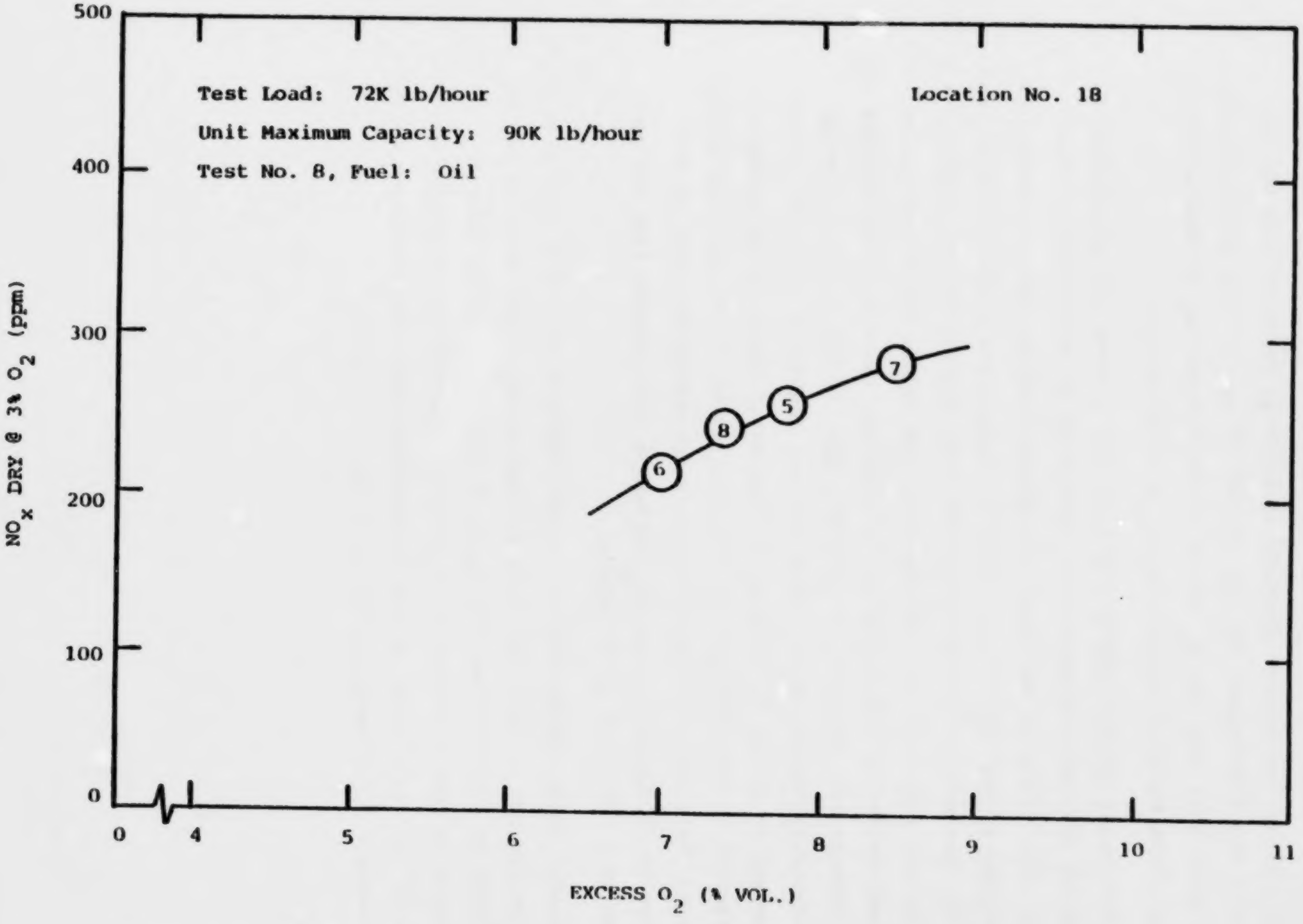

Figure E-2. Effect of Excess Oxygen

O_2 levels. Since the furnace pressure is slightly negative, air may be leaking into the flue passes through the boiler casing into the backpasses and flue duct, such that the O_2 levels in the furnace may be substantially lower than those measured downstream at the sampling port.

The burner pattern previously described offered the opportunity of experimenting with off-stoichiometric combustion by removing the center burner (No. 1). This did not upset the symmetry of the furnace because of the triangular arrangement of the burners. Figure E-1 presents the NO_x and O_2 data for this test. By terminating the fuel flow to the No. 1 burner and leaving the air registers 100 percent open, the excess air to the active burners was reduced to two-thirds of its original value with all burners in service, because the remaining one-third of the air was injected through the out-of-service burner port. This test was conducted at 60,000 lbs/hr steam flow and an excess O_2 level of 8.2 percent. Assuming the excess O_2 levels measured in the flue duct are representative of the air flow through the burners, the percent theoretical air at the burner was reduced from 162 percent to 106 percent. The NO_x emissions were reduced from 240 ppm to 175 ppm or a reduction of 27 percent.

Sulfur oxide concentrations for the baseline operating condition were found to be 485 ppm of total SO_x with 465 ppm of SO_2. The ratio of SO_3/SO_x for this test is 4 percent and the range of data obtained for this SO_x concentration is from 2 percent to 5 percent. Particulate emissions of 0.134 lbs/10^6 Btu were measured for the baseline operating condition which is about average for steam-atomized No. 6 fuel oil tests.

APPENDIX F

TABULATION OF 15-MINUTE DATA

24 HOUR DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
3/14/79		15.2	8.7	8.7	181.	266.	147.
3/15/79		16.0	9.0	9.2	183.	274.	151.
3/16/79		15.4	8.5	10.9	163.	236.	130.
3/17/79		15.3	8.1	11.9	157.	220.	121.
3/18/79		18.1	8.1	10.5	196.	273.	151.
3/19/79		16.5	7.7	11.4	162.	219.	121.
3/20/79		16.7	7.6	12.6	152.	204.	112.
3/21/79		16.6	7.5	11.4	132.	175.	97.
3/22/79		16.5	7.6	10.1	121.	163.	90.
3/23/79		16.5	7.6	10.1	119.	160.	88.
3/24/79		16.4	7.9	9.8	132.	182.	100.
3/25/79		16.3	8.5	9.6	135.	195.	107.
3/26/79		16.4	8.0	9.9	132.	183.	101.
3/27/79		16.6	7.8	10.4	111.	151.	83.
3/28/79		16.6	7.9	10.4	119.	164.	90.
3/29/79		11.2	10.5	8.4	0.	0.	0.
3/30/79		12.9	10.5	7.9	125.	216.	119.
3/31/79		13.9	10.1	8.3	133.	220.	121.
4/ 1/79		13.6	10.8	7.7	121.	214.	118.
4/ 2/79		15.7	9.2	8.9	127.	196.	108.
4/ 3/79		16.1	8.1	9.9	117.	163.	90.
4/ 4/79		16.0	8.3	10.1	123.	176.	97.
4/ 5/79		16.3	7.3	10.1	126.	165.	91.
4/ 6/79		16.8	7.1	10.1	123.	160.	88.
4/ 7/79		17.2	6.8	10.4	153.	194.	107.
4/ 8/79		20.6	6.7	10.5	163.	205.	113.
4/ 9/79		20.7	6.3	10.6	187.	229.	126.
4/10/79		17.8	6.8	10.5	181.	230.	127.
4/11/79		13.9	10.1	8.2	132.	218.	120.
4/12/79		17.3	8.1	9.6	165.	231.	127.
4/13/79		19.2	8.8	9.3	158.	234.	129.
4/14/79		18.5	6.7	10.1	181.	229.	126.
4/15/79		18.9	7.2	10.0	166.	218.	120.
4/16/79		19.5	7.4	10.1	173.	230.	127.
4/17/79		17.0	7.7	10.0	161.	218.	120.
4/18/79		16.8	7.9	9.9	137.	190.	105.
4/19/79		16.7	9.2	9.7	121.	184.	101.

```
*******************************************************************
**                      15 MIN, DATA                             **
**                 DRY STACK GAS CONCENTRATION                   **
**                                                               **
**                            O2     CO2     NO     NO     NO    **
**                  LOAD    VOL%    VOL%   PPMV   PPMV   NG/J    **
**    DATE   TIME   MWTH    MEAS    MEAS   MEAS   3%O2           **
*******************************************************************
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 0/ 0/79      0     .0      .0      .0     0.     0.     0.    **
** 3/14/79   1100   11.1     9.9     7.8   156.   255.   140.    **
** 3/14/79   1115   11.6     9.8     7.8   161.   259.   143.    **
** 3/14/79   1130   11.6     9.7     7.8   164.   262.   145.    **
** 3/14/79   1145   11.6     9.7     7.8   163.   260.   143.    **
** 3/14/79   1200   11.6     9.6     7.9   163.   258.   142.    **
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**********************************************************************
**                           15 MIN. DATA                           **
**                   DRY STACK GAS CONCENTRATION                    **
**                                                                  **
**                           O2      CO2     NO      NO      NO     **
**                    LOAD  VOL%    VOL%   PPMV    PPMV    NG/J     **
**   DATE        TIME  MWTH  MEAS    MEAS   MEAS    3%O2            **
**********************************************************************
** 3/14/79    1215  11.4    9.6     7.9    162.    257.    142.     **
** 3/14/79    1230  11.4    9.7     7.9    161.    258.    142.     **
** 3/14/79    1245  11.4    9.7     7.9    156.    249.    137.     **
** 3/14/79    1300  11.4    9.7     7.9    153.    246.    136.     **
** 3/14/79    1315  13.6    9.6     8.3    165.    262.    145.     **
** 3/14/79    1330  13.6    9.1     8.7    173.    263.    145.     **
** 3/14/79    1345  13.6    8.5     8.9    184.    267.    147.     **
** 3/14/79    1400  13.6    8.4     8.9    186.    268.    148.     **
** 3/14/79    1415  16.3    8.3     8.9    189.    269.    148.     **
** 3/14/79    1430  16.3    8.4     8.9    191.    273.    151.     **
** 3/14/79    1445  16.3    8.3     8.9    193.    275.    152.     **
** 3/14/79    1500  16.3    8.3     8.9    196.    279.    154.     **
** 3/14/79    1515  16.4    8.3     8.9    199.    282.    156.     **
** 3/14/79    1530  16.4    8.3     8.9    200.    285.    157.     **
** 3/14/79    1545  16.4    8.3     8.9    203.    289.    159.     **
** 3/14/79    1600  16.4    8.3     8.9    203.    289.    159.     **
** 3/14/79    1615  16.4    8.4     8.9    191.    274.    151.     **
** 3/14/79    1630  16.4    8.5     8.9    191.    275.    151.     **
** 3/14/79    1645  16.4    8.5     8.9    191.    274.    151.     **
** 3/14/79    1700  16.4    8.5     8.9    190.    274.    151.     **
** 3/14/79    1715  16.3    8.5     8.8    190.    274.    151.     **
** 3/14/79    1730  16.3    8.5     8.8    189.    274.    151.     **
** 3/14/79    1745  16.3    8.5     8.8    189.    274.    151.     **
** 3/14/79    1800  16.3    8.6     8.8    188.    273.    150.     **
** 3/14/79    1815  16.3    8.6     8.8    186.    272.    150.     **
** 3/14/79    1830  16.3    8.6     8.8    185.    270.    149.     **
** 3/14/79    1845  16.3    8.7     8.8    183.    268.    148.     **
** 3/14/79    1900  16.3    8.6     8.8    182.    266.    147.     **
** 3/14/79    1915  16.3    8.6     8.8    180.    262.    144.     **
** 3/14/79    1930  16.3    8.6     8.9    179.    260.    143.     **
** 3/14/79    1945  16.3    8.5     8.9    178.    258.    142.     **
** 3/14/79    2000  16.3    8.5     8.9    177.    256.    141.     **
** 3/14/79    2015  16.3    8.5     8.9    176.    253.    140.     **
** 3/14/79    2030  16.3    8.5     8.9    173.    250.    138.     **
** 3/14/79    2045  16.3    8.5     8.9    172.    248.    137.     **
** 3/14/79    2100  16.3    8.5     8.9    172.    249.    137.     **
** 3/14/79    2115  16.1    8.5     8.9    172.    250.    138.     **
** 3/14/79    2130  16.1    8.5     8.9    173.    251.    138.     **
** 3/14/79    2145  16.1    8.5     8.8    173.    251.    138.     **
** 3/14/79    2200  16.1    8.6     8.8    171.    248.    137.     **
** 3/14/79    2215  16.1    8.5     8.8    173.    250.    138.     **
** 3/14/79    2230  16.1    8.5     8.8    180.    260.    143.     **
** 3/14/79    2245  16.1    8.5     8.8    182.    263.    145.     **
** 3/14/79    2300  16.1    8.5     8.8    185.    267.    147.     **
** 3/14/79    2315  16.1    8.5     8.8    189.    274.    151.     **
** 3/14/79    2330  16.1    8.5     8.8    191.    277.    153.     **
** 3/14/79    2345  16.1    8.6     8.7    194.    282.    156.     **
** 3/14/79    2400  16.1    8.7     8.7    197.    289.    159.     **
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****************************************************************
**                       15 MIN. DATA                         **
**               DRY STACK GAS CONCENTRATION                  **
**                                                            **
**                          O2     CO2     NO     NO     NO   **
**                   LOAD  VOL%   VOL%    PPMV   PPMV   NG/J  **
**   DATE     TIME   MWTH  MEAS   MEAS    MEAS   3%O2         **
****************************************************************
** 3/15/79     15   16.1    8.8    8.8    201.   298.   164.  **
** 3/15/79     30   16.1    8.8    8.8    203.   300.   165.  **
** 3/15/79     45   16.1    8.8    8.8    205.   303.   167.  **
** 3/15/79    100   16.1    8.8    8.8    207.   306.   169.  **
** 3/15/79    115   16.0    8.8    8.8    207.   306.   169.  **
** 3/15/79    130   16.0    8.9    8.7    204.   304.   168.  **
** 3/15/79    145   16.0    9.0    8.7    202.   303.   167.  **
** 3/15/79    200   16.0    8.9    8.7    204.   305.   168.  **
** 3/15/79    215   15.8    9.0    8.7    204.   306.   169.  **
** 3/15/79    230   15.8    9.0    8.8    205.   309.   170.  **
** 3/15/79    245   15.8    9.0    8.8    206.   310.   171.  **
** 3/15/79    300   15.8    9.0    8.7    205.   309.   170.  **
** 3/15/79    315   16.1    9.0    8.7    205.   309.   170.  **
** 3/15/79    330   16.1    9.0    8.8    205.   308.   170.  **
** 3/15/79    345   16.1    9.0    8.7    205.   308.   170.  **
** 3/15/79    400   16.1    9.0    8.8    205.   309.   170.  **
** 3/15/79    415   16.0    9.0    8.8    205.   308.   170.  **
** 3/15/79    430   16.0    9.0    8.8    205.   308.   170.  **
** 3/15/79    445   16.0    9.0    8.8    204.   307.   169.  **
** 3/15/79    500   16.0    9.0    8.8    204.   307.   169.  **
** 3/15/79    515   16.0    9.0    8.8    203.   305.   168.  **
** 3/15/79    530   16.0    9.0    8.8    202.   304.   168.  **
** 3/15/79    545   16.0    9.0    8.8    202.   303.   167.  **
** 3/15/79    600   16.0    9.0    8.8    201.   301.   166.  **
** 3/15/79    615   16.0    9.0    8.8    200.   300.   165.  **
** 3/15/79    630   16.0    9.0    8.8    199.   299.   165.  **
** 3/15/79    645   16.0    9.0    8.8    199.   300.   165.  **
** 3/15/79    700   16.0    9.0    8.8    199.   300.   165.  **
** 3/15/79    715   16.0    9.0    8.8    199.   299.   165.  **
** 3/15/79    730   16.0    9.0    8.8    198.   297.   164.  **
** 3/15/79    745   16.0    9.0    8.8    199.   300.   165.  **
** 3/15/79    800   16.0    9.0    8.9    200.   300.   166.  **
** 3/15/79    815   16.0    9.0    8.9    200.   301.   166.  **
** 3/15/79    830   16.0    9.0    8.9    201.   301.   166.  **
** 3/15/79    845   16.0    8.9    8.9    201.   300.   166.  **
** 3/15/79    900   16.0    9.0    8.9     -1.    -1.    -1.  **
** 3/15/79    915   16.1    8.9    8.8    199.   296.   163.  **
** 3/15/79    930   16.1    8.9    8.8    201.   300.   165.  **
** 3/15/79    945   16.1    9.0    8.8    180.   270.   149.  **
** 3/15/79   1000   16.1    9.1    8.8    176.   268.   148.  **
** 3/15/79   1015   16.0    9.1     .0    179.   272.   150.  **
** 3/15/79   1030   16.0    9.2    9.4    181.   277.   152.  **
** 3/15/79   1045   16.0    9.1    9.4    175.   267.   147.  **
** 3/15/79   1100   16.0    9.1    9.4    173.   262.   144.  **
** 3/15/79   1115   16.0    9.0    9.4    174.   264.   145.  **
** 3/15/79   1130   16.0    9.0    9.4    176.   264.   146.  **
** 3/15/79   1145   16.0    9.0    9.4    176.   265.   146.  **
** 3/15/79   1200   16.0    9.0    9.4    177.   267.   147.  **
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***********************************************************************
**                       15 MIN. DATA                                **
**                  DRY STACK GAS CONCENTRATION                      **
**                                                                   **
**                          O2       CO2     NO      NO      NO      **
**                 LOAD    VOL%     VOL%     PPMV    PPMV    NG/J    **
**   DATE   TIME   MWTH    MEAS     MEAS     MEAS    3%O2            **
***********************************************************************
** 3/15/79   1215  16.0     9.0      9.4     178.    267.    147.    **
** 3/15/79   1230  16.0     9.0      9.4     180.    269.    148.    **
** 3/15/79   1245  16.0     9.0      9.4     182.    272.    150.    **
** 3/15/79   1300  16.0     9.0      9.4     182.    274.    151.    **
** 3/15/79   1315  16.1     9.0      9.4     182.    274.    151.    **
** 3/15/79   1330  16.1     9.0      9.4     182.    273.    151.    **
** 3/15/79   1345  16.1     9.0      9.4     182.    274.    151.    **
** 3/15/79   1400  16.1     9.0      9.4     181.    273.    151.    **
** 3/15/79   1415  16.4     8.8      9.5     182.    269.    148.    **
** 3/15/79   1430  16.4     8.7      9.7     179.    263.    145.    **
** 3/15/79   1445  16.4     8.7      9.8     176.    258.    142.    **
** 3/15/79   1500  16.4     8.7      9.7     172.    253.    139.    **
** 3/15/79   1515  16.0     9.0      9.6     167.    252.    139.    **
** 3/15/79   1530  16.0     9.0      9.4     166.    250.    138.    **
** 3/15/79   1545  16.0     9.0      9.4     169.    254.    140.    **
** 3/15/79   1600  16.0     9.0      9.4     167.    251.    138.    **
** 3/15/79   1615  16.1     9.0      9.4     166.    249.    138.    **
** 3/15/79   1630  16.1     9.0      9.4     167.    250.    138.    **
** 3/15/79   1645  16.1     8.9      9.5     167.    249.    137.    **
** 3/15/79   1700  16.1     8.9      9.5     167.    248.    137.    **
** 3/15/79   1715  16.0     8.9      9.5     167.    248.    137.    **
** 3/15/79   1730  16.0     9.0      9.5     166.    250.    138.    **
** 3/15/79   1745  16.0     9.0      9.4     165.    249.    137.    **
** 3/15/79   1800  16.0     9.0      9.4     165.    249.    137.    **
** 3/15/79   1815  16.0     9.0      9.4     166.    249.    137.    **
** 3/15/79   1830  16.0     9.0      9.4     166.    249.    137.    **
** 3/15/79   1845  16.0     9.0      9.4     165.    249.    137.    **
** 3/15/79   1900  16.0     9.1      9.5     164.    249.    137.    **
** 3/15/79   1915  16.0     9.0      9.4     165.    249.    137.    **
** 3/15/79   1930  16.0     9.0      9.4     165.    249.    138.    **
** 3/15/79   1945  16.0     9.0      9.5     165.    249.    137.    **
** 3/15/79   2000  16.0     9.0      9.5     165.    249.    137.    **
** 3/15/79   2015  15.8     9.0      9.5     165.    248.    137.    **
** 3/15/79   2030  15.8     9.0      9.5     165.    249.    137.    **
** 3/15/79   2045  15.8     9.0      9.5     166.    249.    137.    **
** 3/15/79   2100  15.8     9.1      9.3     163.    248.    137.    **
** 3/15/79   2115  16.0     8.9      9.5     162.    242.    134.    **
** 3/15/79   2130  16.0     8.9      9.5     163.    244.    134.    **
** 3/15/79   2145  16.0     8.9      9.6     164.    243.    134.    **
** 3/15/79   2200  16.0     8.9      9.6     164.    244.    134.    **
** 3/15/79   2215  16.0     8.8      9.6     163.    242.    133.    **
** 3/15/79   2230  16.0     8.9      9.6     163.    244.    134.    **
** 3/15/79   2245  16.0     8.8      9.6     163.    242.    134.    **
** 3/15/79   2300  16.0     8.9      9.6     163.    243.    134.    **
** 3/15/79   2315  16.0     8.8      9.6     163.    242.    133.    **
** 3/15/79   2330  16.0     8.8      9.6     163.    242.    134.    **
** 3/15/79   2345  16.0     8.9      9.5     163.    242.    134.    **
** 3/15/79   2400  16.0     8.8      9.6     163.    241.    133.    **
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***********************************************************************
**                         15 MIN. DATA                              **
**                 DRY STACK GAS CONCENTRATION                       **
**                                                                   **
**                             O2      CO2      NO      NO      NO   **
**                    LOAD    VOL%     VOL%    PPMV    PPMV    NG/J  **
**   DATE     TIME    MWTH    MEAS     MEAS    MEAS    3%O2          **
***********************************************************************
** 3/16/79      15    14.6     8.8      9.7    163.    242.    133.  **
** 3/16/79      30    14.6     8.8      9.7    164.    242.    133.  **
** 3/16/79      45    14.6     8.8      9.7    164.    242.    133.  **
** 3/16/79     100    14.6     8.8      9.6    162.    240.    132.  **
** 3/16/79     115    14.6     8.8      9.6    162.    240.    132.  **
** 3/16/79     130    14.6     8.8      9.7    162.    239.    132.  **
** 3/16/79     145    14.6     8.8      9.7    163.    240.    132.  **
** 3/16/79     200    14.6     8.8      9.6    162.    240.    132.  **
** 3/16/79     215    14.6     8.8      9.6    162.    239.    132.  **
** 3/16/79     230    14.6     8.8      9.6    162.    240.    132.  **
** 3/16/79     245    14.6     8.8      9.6    162.    240.    132.  **
** 3/16/79     300    14.6     8.8      9.6    162.    240.    133.  **
** 3/16/79     315    14.6     8.8      9.7    163.    241.    133.  **
** 3/16/79     330    14.6     8.9      9.6    162.    241.    133.  **
** 3/16/79     345    14.6     8.8      9.7    163.    241.    133.  **
** 3/16/79     400    14.6     8.7      9.8    164.    241.    133.  **
** 3/16/79     415    14.4     8.8      9.7    163.    241.    133.  **
** 3/16/79     430    14.4     9.3      9.0    157.    243.    134.  **
** 3/16/79     445    14.4     8.8      9.7    161.    237.    131.  **
** 3/16/79     500    14.4     8.8      9.7    161.    239.    132.  **
** 3/16/79     515    15.8     8.8      9.7    163.    240.    132.  **
** 3/16/79     530    15.8     8.8      9.7    160.    238.    131.  **
** 3/16/79     545    15.8     8.9      9.7    159.    236.    130.  **
** 3/16/79     600    15.8     8.8      9.7    159.    236.    130.  **
** 3/16/79     615    15.8     8.8      9.7    159.    236.    130.  **
** 3/16/79     630    15.8     9.1      9.5    157.    238.    131.  **
** 3/16/79     645    15.8     9.0      9.5    157.    237.    131.  **
** 3/16/79     700    15.8     9.2      9.4    155.    239.    132.  **
** 3/16/79     715    15.7     9.2      9.3    155.    238.    131.  **
** 3/16/79     730    15.7     9.2      9.3    155.    238.    131.  **
** 3/16/79     745    15.7     9.1      9.4    157.    238.    131.  **
** 3/16/79     800    15.7     9.2      9.3    156.    239.    132.  **
** 3/16/79     815    15.7     9.1      9.3    158.    240.    132.  **
** 3/16/79     830    15.7     9.0      9.4    161.    243.    134.  **
** 3/16/79     845    15.7     8.9      9.5    162.    242.    133.  **
** 3/16/79     900    15.7     8.9      9.5    166.    246.    136.  **
** 3/16/79     915    16.0     8.8      9.6    168.    249.    137.  **
** 3/16/79     930    16.0     8.8      9.6    171.    253.    139.  **
** 3/16/79     945    16.0     8.8      9.7    172.    253.    140.  **
** 3/16/79    1000    16.0     8.8      9.7    174.    257.    142.  **
** 3/16/79    1015    16.1    -1.0      9.7     -1.     -1.     -1.  **
** 3/16/79    1030    16.1     9.1      9.7    182.    275.    152.  **
** 3/16/79    1045    16.1     9.0      9.7    183.    275.    152.  **
** 3/16/79    1100    16.1     9.0      9.7    183.    276.    152.  **
** 3/16/79    1115    16.0     9.2      9.6     -1.     -1.     -1.  **
** 3/16/79    1130    16.0    -1.0       .0     -1.     -1.     -1.  **
** 3/16/79    1145    16.0     8.2     12.0    161.    229.    126.  **
** 3/16/79    1200    16.0     8.2     12.0    161.    228.    126.  **
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*********************************************************************
**                        15 MIN. DATA                             **
**                DRY STACK GAS CONCENTRATION                      **
**                                                                 **
**                             O2     CO2     NO      NO      NO   **
**                     LOAD   VOL%   VOL%    PPMV    PPMV    NG/J  **
**    DATE     TIME    MWTH   MEAS   MEAS    MEAS    3%O2          **
*********************************************************************
** 3/16/79     1215    17.3    8.3   12.0    162.    230.    127.  **
** 3/16/79     1230    17.3    8.3   11.9    162.    230.    127.  **
** 3/16/79     1245    17.3    8.4   12.0    167.    239.    132.  **
** 3/16/79     1300    17.3    7.0   13.3    212.    274.    151.  **
** 3/16/79     1315    18.5    6.4   13.5    214.    266.    147.  **
** 3/16/79     1330    18.5    6.5   13.5    214.    267.    147.  **
** 3/16/79     1345    18.5    8.1   12.3    157.    221.    122.  **
** 3/16/79     1400    18.5    7.9   12.2    156.    216.    119.  **
** 3/16/79     1415    16.0    7.9   12.2    157.    217.    120.  **
** 3/16/79     1430    16.0    7.9   12.2    159.    219.    121.  **
** 3/16/79     1445    16.0    7.9   12.2    160.    220.    122.  **
** 3/16/79     1500    16.0    7.9   12.2    160.    221.    122.  **
** 3/16/79     1515    16.1    8.0   12.2    161.    223.    123.  **
** 3/16/79     1530    16.1    8.0   12.2    158.    220.    121.  **
** 3/16/79     1545    16.1    7.9   12.2    157.    217.    119.  **
** 3/16/79     1600    16.1    7.9   12.4    158.    217.    120.  **
** 3/16/79     1615    15.5    7.8   12.4    197.    269.    149.  **
** 3/16/79     1630    15.5    8.4     .0    156.    223.    123.  **
** 3/16/79     1645    15.5    8.5   11.8    149.    215.    119.  **
** 3/16/79     1700    15.5    8.4   11.8    149.    214.    118.  **
** 3/16/79     1715    14.8    8.5   11.7    151.    217.    120.  **
** 3/16/79     1730    14.8    8.5   11.8    150.    216.    119.  **
** 3/16/79     1745    14.8    8.5   11.7    150.    215.    119.  **
** 3/16/79     1800    14.8    8.5   11.7    150.    216.    119.  **
** 3/16/79     1815    14.8    8.5   11.7    148.    214.    118.  **
** 3/16/79     1830    14.8    8.5   11.7    146.    210.    116.  **
** 3/16/79     1845    14.8    8.4   11.7    146.    209.    115.  **
** 3/16/79     1900    14.8    8.4   11.7    148.    212.    117.  **
** 3/16/79     1915    14.6    8.3   11.7    150.    214.    118.  **
** 3/16/79     1930    14.6    9.9   10.2    156.    255.    141.  **
** 3/16/79     1945    14.6    8.1   11.8    151.    212.    117.  **
** 3/16/79     2000    14.6    8.2   11.8    153.    216.    119.  **
** 3/16/79     2015    14.8    8.2   11.8    154.    218.    120.  **
** 3/16/79     2030    14.8    8.2   11.8    156.    221.    122.  **
** 3/16/79     2045    14.8    8.2   11.9    159.    226.    124.  **
** 3/16/79     2100    14.8    8.2   11.9    162.    229.    126.  **
** 3/16/79     2115    14.8    8.2   11.9    163.    230.    127.  **
** 3/16/79     2130    14.8    8.2   11.9    163.    231.    127.  **
** 3/16/79     2145    14.8    8.2   11.8    164.    232.    128.  **
** 3/16/79     2200    14.8    8.3   11.8    165.    235.    129.  **
** 3/16/79     2215    14.8    8.3   11.8    166.    237.    130.  **
** 3/16/79     2230    14.8    8.3   11.9    167.    238.    131.  **
** 3/16/79     2245    14.8    8.3   11.9    167.    237.    131.  **
** 3/16/79     2300    14.8    8.3   11.8    167.    237.    131.  **
** 3/16/79     2315    14.8    8.3   11.8    165.    234.    129.  **
** 3/16/79     2330    14.8    8.3   11.8    165.    234.    129.  **
** 3/16/79     2345    14.8    8.3   11.8    165.    234.    129.  **
** 3/16/79     2400    14.8    8.3   11.8    166.    236.    130.  **
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**                      15 MIN. DATA                           **
**              DRY STACK GAS CONCENTRATION                    **
**                                                             **
**                           O2     CO2     NO     NO     NO   **
**                   LOAD   VOL%   VOL%   PPMV   PPMV   NG/J   **
**   DATE     TIME   MWTH   MEAS   MEAS   MEAS   3%O2          **
*****************************************************************
** 3/17/79      15   14.5    8.3   11.8   165.   235.   130.   **
** 3/17/79      30   14.5    8.4   11.8   164.   234.   129.   **
** 3/17/79      45   14.5    8.3   11.8   164.   234.   129.   **
** 3/17/79     100   14.5    8.4   11.8   164.   234.   129.   **
** 3/17/79     115   17.6    8.4   11.8   163.   233.   129.   **
** 3/17/79     130   17.6    8.4   11.8   162.   232.   128.   **
** 3/17/79     145   17.6    8.3   11.8   163.   232.   128.   **
** 3/17/79     200   17.6    8.4   11.8   164.   234.   129.   **
** 3/17/79     215   17.7    8.4   11.9   164.   235.   129.   **
** 3/17/79     230   17.7    8.4   11.9   166.   237.   131.   **
** 3/17/79     245   17.7    8.4   11.9   165.   237.   131.   **
** 3/17/79     300   17.7    8.4   11.8   164.   234.   129.   **
** 3/17/79     315   17.7    8.4   11.8   164.   235.   130.   **
** 3/17/79     330   17.7    8.4   11.8   163.   233.   129.   **
** 3/17/79     345   17.7    8.4   11.8   162.   232.   128.   **
** 3/17/79     400   17.7    8.4   11.8   162.   231.   128.   **
** 3/17/79     415   19.6    8.4   11.8   162.   232.   128.   **
** 3/17/79     430   19.6    8.4   11.8   162.   232.   128.   **
** 3/17/79     445   19.6    9.1   11.2   164.   248.   137.   **
** 3/17/79     500   19.6    8.8   11.3   162.   240.   132.   **
** 3/17/79     515   16.4    8.5   11.8   159.   229.   126.   **
** 3/17/79     530   16.4    8.4   11.8   157.   224.   124.   **
** 3/17/79     545   16.4    8.4   11.8   158.   227.   125.   **
** 3/17/79     600   16.4    8.5   11.8   159.   229.   126.   **
** 3/17/79     615   14.5    8.5   11.8   160.   230.   127.   **
** 3/17/79     630   14.5    8.5   11.8   159.   229.   126.   **
** 3/17/79     645   14.5    8.4   11.8   158.   227.   125.   **
** 3/17/79     700   14.5    8.5   11.8   158.   228.   125.   **
** 3/17/79     715   14.6    8.5   11.8   157.   226.   125.   **
** 3/17/79     730   14.6    8.4   11.9   158.   227.   125.   **
** 3/17/79     745   14.6    8.4   11.9   157.   226.   124.   **
** 3/17/79     800   14.6    8.4   11.9   160.   229.   127.   **
** 3/17/79     815   14.6    8.4   11.8   163.   235.   129.   **
** 3/17/79     830   14.6    8.4   11.8   166.   239.   132.   **
** 3/17/79     845   14.6    8.4   11.8   168.   241.   133.   **
** 3/17/79     900   14.6    8.4   11.9   172.   248.   136.   **
** 3/17/79     915   14.5    8.4   11.9   178.   255.   141.   **
** 3/17/79     930   14.5    8.4   11.9   183.   262.   144.   **
** 3/17/79     945   14.5    8.4   12.0   190.   273.   151.   **
** 3/17/79    1000   14.5    8.8   11.9   195.   288.   159.   **
** 3/17/79    1015   14.6    9.1   11.9   161.   244.   135.   **
** 3/17/79    1030   14.6   -1.0   11.9   146.   124.    68.   **
** 3/17/79    1045   14.6    8.2   11.9    -1.    -1.    -1.   **
** 3/17/79    1100   14.6    8.1   11.9   150.   210.   116.   **
** 3/17/79    1115   14.8    8.0   11.9   150.   209.   115.   **
** 3/17/79    1130   14.8    8.0   11.9   150.   209.   115.   **
** 3/17/79    1145   14.8    8.0   11.9   150.   209.   115.   **
** 3/17/79    1200   14.8    8.0   12.0   149.   207.   114.   **
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**                         15 MIN. DATA                             **
**                 DRY STACK GAS CONCENTRATION                      **
**                                                                  **
**                            O2      CO2     NO      NO     NO     **
**                   LOAD    VOL%    VOL%    PPMV    PPMV   NG/J    **
**   DATE     TIME   MWTH    MEAS    MEAS    MEAS    3%O2           **
**********************************************************************
** 3/17/79    1215   14.6     7.9    11.9    149.    207.   114.    **
** 3/17/79    1230   14.6     7.9    12.0    151.    208.   115.    **
** 3/17/79    1245   14.6     7.9    12.0    152.    209.   115.    **
** 3/17/79    1300   14.6     7.9    12.0    151.    209.   115.    **
** 3/17/79    1315   14.6     7.9    11.9    151.    208.   115.    **
** 3/17/79    1330   14.6     7.8    11.9    152.    208.   115.    **
** 3/17/79    1345   14.6     7.7    12.0    153.    209.   115.    **
** 3/17/79    1400   14.6     7.7    12.1    154.    209.   115.    **
** 3/17/79    1415   14.6     7.7    12.1    154.    209.   115.    **
** 3/17/79    1430   14.6     7.7    12.1    155.    212.   117.    **
** 3/17/79    1445   14.6     7.7    12.1    157.    213.   118.    **
** 3/17/79    1500   14.6     7.7    12.0    157.    214.   118.    **
** 3/17/79    1515   14.8     7.7    12.0    156.    212.   117.    **
** 3/17/79    1530   14.8     7.6    12.0    157.    213.   117.    **
** 3/17/79    1545   14.8     7.6    12.1    158.    212.   117.    **
** 3/17/79    1600   14.8     7.6    12.1    158.    213.   118.    **
** 3/17/79    1615   14.8     7.6    12.0    158.    213.   117.    **
** 3/17/79    1630   14.8     7.6    12.1    158.    213.   117.    **
** 3/17/79    1645   14.8     7.6    12.1    157.    212.   117.    **
** 3/17/79    1700   14.8     7.6    12.1    157.    211.   116.    **
** 3/17/79    1715   14.8     7.6    12.1    155.    208.   115.    **
** 3/17/79    1730   14.8     7.6    12.1    154.    208.   114.    **
** 3/17/79    1745   14.8     7.6    12.1    154.    207.   114.    **
** 3/17/79    1800   14.8     7.6    12.1    155.    209.   115.    **
** 3/17/79    1815   14.6     7.6    12.0    157.    211.   116.    **
** 3/17/79    1830   14.6     7.6    12.0    157.    211.   117.    **
** 3/17/79    1845   14.6     7.6    12.0    155.    209.   115.    **
** 3/17/79    1900   14.6     7.7    11.9    154.    208.   115.    **
** 3/17/79    1915   14.5     7.7    11.9    151.    205.   113.    **
** 3/17/79    1930   14.5     8.6    10.8    147.    215.   118.    **
** 3/17/79    1945   14.5     7.8    11.8    151.    207.   114.    **
** 3/17/79    2000   14.5     7.9    11.8    151.    208.   115.    **
** 3/17/79    2015   14.5     7.9    11.7    151.    209.   115.    **
** 3/17/79    2030   14.5     7.9    11.7    150.    206.   114.    **
** 3/17/79    2045   14.5     7.9    11.7    150.    206.   114.    **
** 3/17/79    2100   14.5     7.9    11.7    149.    205.   113.    **
** 3/17/79    2115   14.4     7.9    11.7    147.    203.   112.    **
** 3/17/79    2130   14.4     7.9    11.7    145.    200.   110.    **
** 3/17/79    2145   14.4     7.9    11.7    145.    199.   110.    **
** 3/17/79    2200   14.4     7.9    11.7    146.    200.   110.    **
** 3/17/79    2215   14.4     7.9    11.7    147.    201.   111.    **
** 3/17/79    2230   14.4     7.9    11.7    147.    202.   111.    **
** 3/17/79    2245   14.4     7.9    11.7    147.    202.   111.    **
** 3/17/79    2300   14.4     7.9    11.6    146.    202.   112.    **
** 3/17/79    2315   14.4     7.9    11.6    144.    199.   110.    **
** 3/17/79    2330   14.4     7.8    11.6    145.    198.   109.    **
** 3/17/79    2345   14.4     7.8    11.7    146.    200.   110.    **
** 3/17/79    2400   14.4     7.7    11.7    148.    200.   110.    **
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**                         15 MIN. DATA                                 **
**                 DRY STACK GAS CONCENTRATION                          **
**                                                                      **
**                             O2      CO2      NO      NO      NO      **
**                    LOAD    VOL%    VOL%     PPMV    PPMV    NG/J     **
**   DATE     TIME    MWTH    MEAS    MEAS     MEAS    3%O2             **
**************************************************************************
** 3/18/79      15   17.3     7.6     11.8     151.    204.    112.     **
** 3/18/79      30   17.3     7.6     11.8     154.    207.    114.     **
** 3/18/79      45   17.3     7.6     11.8     155.    209.    115.     **
** 3/18/79     100   17.3     7.6     11.8     156.    210.    116.     **
** 3/18/79     115   19.3     6.9     12.5     199.    253.    140.     **
** 3/18/79     130   19.3     6.7     12.7     201.    254.    140.     **
** 3/18/79     145   19.3     6.7     12.6     202.    255.    141.     **
** 3/18/79     200   19.3     6.7     12.6     202.    255.    141.     **
** 3/18/79     215   19.6     6.7     12.6     202.    255.    141.     **
** 3/18/79     230   19.6     6.7     12.6     202.    255.    141.     **
** 3/18/79     245   19.6     6.8     12.6     201.    255.    140.     **
** 3/18/79     300   19.6     6.8     12.6     201.    255.    140.     **
** 3/18/79     315   19.6     6.8     12.6     201.    255.    140.     **
** 3/18/79     330   19.6     6.7     12.6     201.    253.    140.     **
** 3/18/79     345   19.6     6.7     12.6     201.    253.    140.     **
** 3/18/79     400   19.6     6.7     12.6     199.    251.    138.     **
** 3/18/79     415   19.6     6.6     12.6     201.    252.    139.     **
** 3/18/79     430   19.6     7.1     12.2     208.    271.    149.     **
** 3/18/79     445   19.6     7.1     12.2     227.    294.    162.     **
** 3/18/79     500   19.6     6.9     12.4     232.    297.    164.     **
** 3/18/79     515   19.6     6.9     12.4     233.    298.    164.     **
** 3/18/79     530   19.6     6.9     12.4     237.    303.    167.     **
** 3/18/79     545   19.6     7.1     12.1     237.    307.    169.     **
** 3/18/79     600   19.6     7.2     12.2     236.    309.    170.     **
** 3/18/79     615   20.1     7.1     12.2     235.    306.    169.     **
** 3/18/79     630   20.1     7.2     12.2     233.    304.    167.     **
** 3/18/79     645   20.1     7.1     12.2     231.    301.    166.     **
** 3/18/79     700   20.1     7.2     12.2     232.    302.    167.     **
** 3/18/79     715   20.1     7.2     12.2     233.    305.    168.     **
** 3/18/79     730   20.1     7.2     12.2     235.    308.    170.     **
** 3/18/79     745   20.1     7.2     12.2     238.    311.    172.     **
** 3/18/79     800   20.1     7.1     12.2     239.    311.    171.     **
** 3/18/79     815   20.2     7.1     12.3     237.    308.    170.     **
** 3/18/79     830   20.2     7.1     12.3     237.    307.    169.     **
** 3/18/79     845   20.2     7.1     12.3     238.    308.    170.     **
** 3/18/79     900   20.2     7.1     12.4     239.    310.    171.     **
** 3/18/79     915   20.2     7.1     12.4     240.    310.    171.     **
** 3/18/79     930   20.2     7.1     12.3     243.    314.    173.     **
** 3/18/79     945   20.2     7.1     12.3     246.    320.    176.     **
** 3/18/79    1000   20.2     7.1     12.3     248.    322.    177.     **
** 3/18/79    1015   20.4     7.1     12.4      -1.     -1.     -1.     **
** 3/18/79    1030   20.4     7.1     10.1     205.    266.    147.     **
** 3/18/79    1045   20.4     7.2     10.1     209.    273.    151.     **
** 3/18/79    1100   20.4     7.3     10.1     207.    273.    151.     **
** 3/18/79    1115   20.4     7.3     10.1     208.    275.    151.     **
** 3/18/79    1130   20.4     7.3     10.0     208.    274.    151.     **
** 3/18/79    1145   20.4     7.1     10.1     211.    275.    152.     **
** 3/18/79    1200   20.4     7.0     10.1     216.    277.    153.     **
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
3/18/79	1215	19.9	6.9	10.2	215.	276.	152.
3/18/79	1230	19.9	6.9	10.2	216.	276.	152.
3/18/79	1245	19.9	7.1	10.2	218.	282.	155.
3/18/79	1300	19.9	8.3	9.6	207.	295.	163.
3/18/79	1315	16.4	9.1	9.0	198.	301.	166.
3/18/79	1330	16.4	9.1	9.0	200.	303.	167.
3/18/79	1345	16.4	9.1	9.0	202.	308.	170.
3/18/79	1400	16.4	9.1	9.0	203.	309.	170.
3/18/79	1415	16.3	9.1	8.9	204.	310.	171.
3/18/79	1430	16.3	9.1	8.9	205.	313.	172.
3/18/79	1445	16.3	9.1	9.0	205.	313.	172.
3/18/79	1500	16.3	9.2	9.0	205.	314.	173.
3/18/79	1515	16.3	9.2	9.0	204.	312.	172.
3/18/79	1530	16.3	9.2	9.0	204.	312.	172.
3/18/79	1545	16.3	9.1	9.0	204.	310.	171.
3/18/79	1600	16.3	9.1	9.0	202.	307.	169.
3/18/79	1615	16.3	9.2	9.1	203.	310.	171.
3/18/79	1630	16.3	9.2	9.1	201.	307.	169.
3/18/79	1645	16.3	9.2	9.1	193.	297.	164.
3/18/79	1700	16.3	9.2	9.2	187.	286.	158.
3/18/79	1715	16.3	9.1	9.1	184.	280.	154.
3/18/79	1730	16.3	9.2	9.1	182.	279.	154.
3/18/79	1745	16.3	9.2	9.1	181.	278.	153.
3/18/79	1800	16.3	9.1	9.1	181.	275.	152.
3/18/79	1815	16.1	9.1	9.1	178.	271.	150.
3/18/79	1830	16.1	9.1	9.1	177.	268.	148.
3/18/79	1845	16.1	9.1	9.1	176.	268.	148.
3/18/79	1900	16.1	9.2	9.1	173.	265.	146.
3/18/79	1915	16.1	9.5	8.7	166.	262.	145.
3/18/79	1930	16.1	9.3	8.9	167.	257.	142.
3/18/79	1945	16.1	9.3	8.9	166.	256.	141.
3/18/79	2000	16.1	9.3	8.9	165.	255.	141.
3/18/79	2015	16.1	9.3	8.9	164.	254.	140.
3/18/79	2030	16.1	9.3	8.9	159.	246.	135.
3/18/79	2045	16.1	9.3	8.9	157.	242.	133.
3/18/79	2100	16.1	9.3	8.9	154.	238.	131.
3/18/79	2115	16.1	9.3	8.9	151.	233.	128.
3/18/79	2130	16.1	9.2	8.9	149.	230.	127.
3/18/79	2145	16.1	9.2	8.9	148.	228.	126.
3/18/79	2200	16.1	9.3	8.9	147.	226.	125.
3/18/79	2215	16.0	9.2	8.9	144.	221.	122.
3/18/79	2230	16.0	9.2	8.9	142.	218.	120.
3/18/79	2245	16.0	9.2	8.9	139.	214.	118.
3/18/79	2300	16.0	9.2	8.9	138.	212.	117.
3/18/79	2315	16.0	9.2	8.9	138.	211.	116.
3/18/79	2330	16.0	9.2	8.9	137.	210.	116.
3/18/79	2345	16.0	9.2	8.8	133.	203.	112.
3/18/79	2400	16.0	9.2	8.9	134.	205.	113.

```
***************************************************************************
**                        15 MIN. DATA                                   **
**                DRY STACK GAS CONCENTRATION                            **
**                                                                       **
**                              O2      CO2      NO      NO      NO      **
**                      LOAD    VOL%    VOL%     PPMV    PPMV    NG/J    **
**    DATE      TIME    MWTH    MEAS    MEAS     MEAS    3%O2            **
***************************************************************************
** 3/19/79        15    15.4     9.2     8.9     134.    205.    113.    **
** 3/19/79        30    15.4     8.2    10.1     138.    195.    107.    **
** 3/19/79        45    15.4     7.5    10.3     146.    195.    108.    **
** 3/19/79       100    15.4     7.5    10.3     146.    196.    108.    **
** 3/19/79       115    16.1     7.6    10.3     146.    196.    108.    **
** 3/19/79       130    16.1     7.3    10.5     145.    191.    105.    **
** 3/19/79       145    16.1     7.2    10.5     145.    190.    105.    **
** 3/19/79       200    16.1     7.2    10.6     144.    188.    104.    **
** 3/19/79       215    16.1     7.2    10.6     144.    188.    104.    **
** 3/19/79       230    16.1     7.2    10.6     145.    190.    105.    **
** 3/19/79       245    16.1     7.2    10.6     145.    189.    104.    **
** 3/19/79       300    16.1     7.2    10.6     145.    190.    105.    **
** 3/19/79       315    16.1     7.4    10.5     145.    192.    106.    **
** 3/19/79       330    16.1     7.2    10.5     145.    190.    105.    **
** 3/19/79       345    16.1     7.2    10.5     146.    191.    105.    **
** 3/19/79       400    16.1     7.2    10.5     145.    190.    105.    **
** 3/19/79       415    18.3     7.4    10.4     144.    191.    105.    **
** 3/19/79       430    18.3     7.2    10.4     159.    209.    115.    **
** 3/19/79       445    18.3     7.8     9.9     153.    209.    115.    **
** 3/19/79       500    18.3     7.6    10.2     149.    202.    111.    **
** 3/19/79       515    18.3     7.7    10.1     148.    201.    111.    **
** 3/19/79       530    18.3     7.7    10.1     147.    200.    110.    **
** 3/19/79       545    18.3     7.7    10.1     147.    200.    110.    **
** 3/19/79       600    18.3     7.6    10.2     148.    200.    110.    **
** 3/19/79       615    18.5     7.6    10.1     148.    200.    110.    **
** 3/19/79       630    18.5     7.6    10.1     147.    199.    109.    **
** 3/19/79       645    18.5     7.7    10.1     148.    201.    111.    **
** 3/19/79       700    18.5     7.7    10.1      77.    104.     57.    **
** 3/19/79       715    18.3     7.7    10.1     153.    208.    115.    **
** 3/19/79       730    18.3     7.7    10.1     153.    208.    115.    **
** 3/19/79       745    18.3     7.7    10.0     154.    209.    115.    **
** 3/19/79       800    18.3     7.7    10.0     155.    211.    116.    **
** 3/19/79       815    17.6     7.7    10.0     154.    210.    116.    **
** 3/19/79       830    17.6     7.8    10.0     154.    211.    116.    **
** 3/19/79       845    17.6     8.3     9.6     155.    221.    122.    **
** 3/19/79       900    17.6     7.7    10.0      -1.     -1.     -1.    **
** 3/19/79       915    16.3     7.8    10.0      -1.     -1.     -1.    **
** 3/19/79       930    16.3     7.8    10.0      -1.     -1.     -1.    **
** 3/19/79       945    16.3     7.7    10.1     162.    220.    121.    **
** 3/19/79      1000    16.3     7.7    10.1     162.    221.    122.    **
** 3/19/79      1015    16.4     7.7    12.3     163.    221.    122.    **
** 3/19/79      1030    16.4     7.6    12.5     164.    221.    122.    **
** 3/19/79      1045    16.4     7.7    12.4     163.    221.    122.    **
** 3/19/79      1100    16.4     7.7    12.4     162.    221.    122.    **
** 3/19/79      1115    16.3     7.7    12.4     164.    222.    122.    **
** 3/19/79      1130    16.3     7.6    12.4     165.    222.    122.    **
** 3/19/79      1145    16.3     7.6    12.4     164.    222.    123.    **
** 3/19/79      1200    16.3     7.8    12.4     166.    227.    125.    **
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******************************************************************************
**                          15 MIN. DATA                                    **
**                 DRY STACK GAS CONCENTRATION                              **
**                                                                          **
**                            O2      CO2      NO       NO       NO         **
**                   LOAD    VOL%     VOL%     PPMV     PPMV     NG/J       **
**   DATE     TIME   MWTH    MEAS     MEAS     MEAS     3%O2                **
******************************************************************************
** 3/19/79    1215   16.1     7.6     12.4     167.     225.     124.       **
** 3/19/79    1230   16.1     7.6     12.4     169.     227.     125.       **
** 3/19/79    1245   16.1     7.6     12.3     169.     228.     126.       **
** 3/19/79    1300   16.1     7.6     12.3     167.     225.     124.       **
** 3/19/79    1315   16.3     7.6     12.3     169.     228.     126.       **
** 3/19/79    1330   16.3     7.5     12.4     170.     227.     125.       **
** 3/19/79    1345   16.3     7.4     12.4     172.     228.     126.       **
** 3/19/79    1400   16.3     7.7     12.4     170.     231.     127.       **
** 3/19/79    1415   16.3     7.6     12.4     171.     230.     127.       **
** 3/19/79    1430   16.3     7.5     12.4     172.     231.     127.       **
** 3/19/79    1445   16.3     7.4     12.5     173.     230.     127.       **
** 3/19/79    1500   16.3     7.4     12.5     174.     231.     128.       **
** 3/19/79    1515   16.4     7.3     12.5     176.     232.     128.       **
** 3/19/79    1530   16.4     7.3     12.5     179.     235.     130.       **
** 3/19/79    1545   16.4     7.2     12.5     182.     237.     131.       **
** 3/19/79    1600   16.4     7.3     12.6     185.     243.     134.       **
** 3/19/79    1615   16.4     7.3     12.6     187.     247.     136.       **
** 3/19/79    1630   16.4     7.3     12.6     191.     252.     139.       **
** 3/19/79    1645   16.4     7.3     12.6     196.     258.     142.       **
** 3/19/79    1700   16.4     7.4     12.6     196.     261.     144.       **
** 3/19/79    1715   16.4     7.6     12.6     196.     264.     146.       **
** 3/19/79    1730   16.4     7.6     12.6     191.     257.     142.       **
** 3/19/79    1745   16.4     7.6     12.6     189.     254.     140.       **
** 3/19/79    1800   16.4     7.6     12.5     185.     249.     137.       **
** 3/19/79    1815   16.3     7.6     12.5      -1.      -1.      -1.       **
** 3/19/79    1830   16.3     7.6     12.5     169.     227.     125.       **
** 3/19/79    1845   16.3     7.6     12.5     167.     224.     124.       **
** 3/19/79    1900   16.3     7.6     12.5     166.     223.     123.       **
** 3/19/79    1915   15.8     7.6     12.5     166.     224.     124.       **
** 3/19/79    1930   15.8     7.7     12.5     167.     227.     125.       **
** 3/19/79    1945   15.8     9.1     11.3     164.     249.     137.       **
** 3/19/79    2000   15.8     8.6     11.1     167.     244.     134.       **
** 3/19/79    2015   15.4     8.3     11.7     167.     238.     131.       **
** 3/19/79    2030   15.4     8.3     11.7     167.     238.     131.       **
** 3/19/79    2045   15.4     8.3     11.7     166.     237.     131.       **
** 3/19/79    2100   15.4     8.3     11.7     167.     237.     131.       **
** 3/19/79    2115   15.4     8.3     11.7     167.     238.     131.       **
** 3/19/79    2130   15.4     8.3     11.7     167.     238.     131.       **
** 3/19/79    2145   15.4     8.3     11.7     167.     237.     131.       **
** 3/19/79    2200   15.4     8.3     11.7     165.     235.     129.       **
** 3/19/79    2215   15.4     8.3     11.7     166.     235.     130.       **
** 3/19/79    2230   15.4     8.3     11.7     166.     235.     130.       **
** 3/19/79    2245   15.4     8.3     11.7     166.     236.     130.       **
** 3/19/79    2300   15.4     8.3     11.7     165.     236.     130.       **
** 3/19/79    2315   15.4     8.3     11.7     164.     233.     129.       **
** 3/19/79    2330   15.4     8.3     11.7     165.     234.     129.       **
** 3/19/79    2345   15.4     8.3     11.7     164.     233.     128.       **
** 3/19/79    2400   15.4     8.3     11.7     163.     232.     128.       **
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****************************************************************
**                       15 MIN. DATA                         **
**               DRY STACK GAS CONCENTRATION                  **
**                                                            **
**                         O2      CO2     NO     NO     NO   **
**                 LOAD   VOL%    VOL%    PPMV   PPMV   NG/J  **
**   DATE   TIME   MWTH   MEAS    MEAS    MEAS   3%O2         **
****************************************************************
** 3/20/79    15   16.6    8.3    11.7    162.   230.   127.  **
** 3/20/79    30   16.6    8.3    11.7    160.   228.   126.  **
** 3/20/79    45   16.6    8.3    11.7    159.   226.   125.  **
** 3/20/79   100   16.6    8.3    11.7    159.   226.   125.  **
** 3/20/79   115   16.6    8.3    11.7    161.   228.   126.  **
** 3/20/79   130   16.6    7.7    12.3    158.   215.   119.  **
** 3/20/79   145   16.6    7.7    12.3    158.   214.   118.  **
** 3/20/79   200   16.6    7.7    12.3    159.   215.   118.  **
** 3/20/79   215   16.4    7.7    12.3    158.   214.   118.  **
** 3/20/79   230   16.4    7.7    12.3    157.   213.   118.  **
** 3/20/79   245   16.4    7.6    12.3    157.   212.   117.  **
** 3/20/79   300   16.4    7.6    12.3    157.   212.   117.  **
** 3/20/79   315   17.0    7.6    12.3    157.   212.   117.  **
** 3/20/79   330   17.0    7.7    12.3    156.   211.   117.  **
** 3/20/79   345   17.0    7.7    12.3    156.   211.   117.  **
** 3/20/79   400   17.0    7.6    12.3    155.   210.   116.  **
** 3/20/79   415   16.6    7.6    12.3    154.   208.   115.  **
** 3/20/79   430   16.6    7.6    12.3    155.   209.   115.  **
** 3/20/79   445   16.6    7.5    12.5    161.   215.   119.  **
** 3/20/79   500   16.6    7.8    12.5    203.   278.   153.  **
** 3/20/79   515   16.4    7.9    12.3    218.   301.   166.  **
** 3/20/79   530   16.4    8.3    11.8    148.   210.   116.  **
** 3/20/79   545   16.4    7.4    12.5    141.   187.   103.  **
** 3/20/79   600   16.4    7.4    12.5    142.   189.   104.  **
** 3/20/79   615   16.4    7.4    12.5    142.   189.   104.  **
** 3/20/79   630   16.4    7.4    12.5    143.   190.   105.  **
** 3/20/79   645   16.4    7.4    12.5    142.   189.   104.  **
** 3/20/79   700   16.4    7.4    12.5    142.   189.   104.  **
** 3/20/79   715   16.4    7.4    12.5    143.   190.   105.  **
** 3/20/79   730   16.4    7.4    12.5    142.   189.   104.  **
** 3/20/79   745   16.4    7.4    12.5    144.   192.   106.  **
** 3/20/79   800   16.4    7.4    12.5    145.   193.   106.  **
** 3/20/79   815   16.4    7.4    12.5    145.   192.   106.  **
** 3/20/79   830   16.4    7.4    12.5    145.   193.   106.  **
** 3/20/79   845   16.4    7.4    12.5    147.   194.   107.  **
** 3/20/79   900   16.4    7.4    12.5    147.   194.   107.  **
** 3/20/79   915   16.4    7.3    12.5    147.   194.   107.  **
** 3/20/79   930   16.4    7.3    12.5    147.   194.   107.  **
** 3/20/79   945   16.4    9.2    11.0    125.   192.   106.  **
** 3/20/79  1000   16.4    8.1    11.7    138.   194.   107.  **
** 3/20/79  1015   16.4    8.0    11.8    141.   195.   107.  **
** 3/20/79  1030   16.4    8.0      .0    141.   196.   108.  **
** 3/20/79  1045   16.4    8.4      .0    143.   205.   113.  **
** 3/20/79  1100   16.4    8.3    12.0    144.   205.   113.  **
** 3/20/79  1115   16.4    8.2    12.1    147.   208.   114.  **
** 3/20/79  1130   16.4    8.1    12.1    149.   209.   115.  **
** 3/20/79  1145   16.4    7.9    12.3    149.   206.   114.  **
** 3/20/79  1200   16.4    7.7    12.6    152.   206.   114.  **
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******************************************************************************
**                               15 MIN. DATA                               **
**                        DRY STACK GAS CONCENTRATION                       **
**                                                                          **
**                             O2       CO2      NO       NO       NO       **
**                    LOAD    VOL%     VOL%     PPMV     PPMV     NG/J      **
**  DATE        TIME  MWTH    MEAS     MEAS     MEAS     3%O2               **
******************************************************************************
** 3/20/79      1215  16.7     7.5     12.8     154.     206.     113.      **
** 3/20/79      1230  16.7     7.3     12.9     156.     206.     113.      **
** 3/20/79      1245  16.7     7.1     13.1     162.     211.     116.      **
** 3/20/79      1300  16.7     7.1     13.0     163.     212.     117.      **
** 3/20/79      1315  16.7     7.2     13.0     166.     217.     120.      **
** 3/20/79      1330  16.7     7.2     12.9     168.     219.     121.      **
** 3/20/79      1345  16.7     7.2     13.0     159.     207.     114.      **
** 3/20/79      1400  16.7     7.1     12.9     152.     198.     109.      **
** 3/20/79      1415  16.6     7.2     12.9     151.     198.     109.      **
** 3/20/79      1430  16.6     7.2     12.9     150.     196.     108.      **
** 3/20/79      1445  16.6     7.2     12.9     149.     195.     108.      **
** 3/20/79      1500  16.6     7.2     12.9     149.     195.     108.      **
** 3/20/79      1515  16.6     7.2     12.9     148.     194.     107.      **
** 3/20/79      1530  16.6     7.2     12.9     149.     194.     107.      **
** 3/20/79      1545  16.6     7.2     12.9     149.     195.     107.      **
** 3/20/79      1600  16.6     7.1     12.9     152.     198.     109.      **
** 3/20/79      1615  16.7     7.1     13.0     153.     198.     109.      **
** 3/20/79      1630  16.7     7.1     13.0     154.     201.     111.      **
** 3/20/79      1645  16.7     7.1     13.0     156.     203.     112.      **
** 3/20/79      1700  16.7     7.3     12.9     154.     203.     112.      **
** 3/20/79      1715  16.7     7.3     12.9     151.     199.     110.      **
** 3/20/79      1730  16.7     7.4     12.9     150.     198.     109.      **
** 3/20/79      1745  16.7     7.4     12.9     148.     197.     108.      **
** 3/20/79      1800  16.7     7.4     12.9     148.     197.     108.      **
** 3/20/79      1815  16.8     7.1     13.4     171.     222.     123.      **
** 3/20/79      1830  16.8     7.6     12.9     198.     268.     148.      **
** 3/20/79      1845  16.8     7.8     12.5     180.     246.     136.      **
** 3/20/79      1900  16.8     7.6     12.7     146.     197.     109.      **
** 3/20/79      1915  18.2     7.6     12.7     145.     197.     108.      **
** 3/20/79      1930  18.2     7.7     12.7     144.     196.     108.      **
** 3/20/79      1945  18.2     7.7     12.7     144.     195.     108.      **
** 3/20/79      2000  18.2     7.7     12.7     143.     194.     107.      **
** 3/20/79      2015  16.8     7.6     12.7     143.     193.     107.      **
** 3/20/79      2030  16.8     7.6     12.8     143.     193.     106.      **
** 3/20/79      2045  16.8     7.6     12.8     143.     192.     106.      **
** 3/20/79      2100  16.8     7.6     12.7     143.     193.     106.      **
** 3/20/79      2115  16.8     7.6     12.7     144.     194.     107.      **
** 3/20/79      2130  16.8     7.6     12.8     144.     194.     107.      **
** 3/20/79      2145  16.8     7.6     12.8     146.     196.     108.      **
** 3/20/79      2200  16.8     7.5     12.9     146.     195.     107.      **
** 3/20/79      2215  16.8     7.6     12.8     143.     192.     106.      **
** 3/20/79      2230  16.8     7.6     12.7     140.     190.     105.      **
** 3/20/79      2245  16.8     7.7     12.7     140.     189.     104.      **
** 3/20/79      2300  16.8     7.6     12.7     140.     190.     105.      **
** 3/20/79      2315  16.7     7.6     12.8     141.     191.     105.      **
** 3/20/79      2330  16.7     7.7     12.8     140.     190.     105.      **
** 3/20/79      2345  16.7     7.6     12.8     139.     188.     104.      **
** 3/20/79      2400  16.7     7.7     12.8     139.     188.     104.      **
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*********************************************************************
**                        15 MIN. DATA                             **
**                DRY STACK GAS CONCENTRATION                      **
**                                                                 **
**                           O2      CO2     NO      NO      NO    **
**                   LOAD    VOL%    VOL%    PPMV    PPMV    NG/J  **
**   DATE     TIME   MWTH    MEAS    MEAS    MEAS    3%O2          **
*********************************************************************
** 3/21/79      15   16.6     7.7    12.8    139.    188.    104.  **
** 3/21/79      30   16.6     7.6    12.8    140.    190.    105.  **
** 3/21/79      45   16.6     7.7    12.8    142.    192.    106.  **
** 3/21/79     100   16.6     7.7    12.8    142.    192.    106.  **
** 3/21/79     115   16.6     7.7    12.8    142.    193.    106.  **
** 3/21/79     130   16.6     7.7    12.8    142.    193.    106.  **
** 3/21/79     145   16.6     7.7    12.7    142.    193.    106.  **
** 3/21/79     200   16.6     7.7    12.7    141.    192.    106.  **
** 3/21/79     215   16.6     7.7    12.7    141.    191.    105.  **
** 3/21/79     230   16.6     7.7    12.7    141.    191.    105.  **
** 3/21/79     245   16.6     7.7    12.7    141.    192.    106.  **
** 3/21/79     300   16.6     7.7    12.7    141.    192.    106.  **
** 3/21/79     315   16.6     7.7    12.7    142.    193.    106.  **
** 3/21/79     330   16.6     8.5    12.0    139.    201.    111.  **
** 3/21/79     345   16.6     7.7    12.7    140.    190.    105.  **
** 3/21/79     400   16.6     7.7    12.7    139.    190.    105.  **
** 3/21/79     415   16.4     7.7    12.7    137.    186.    103.  **
** 3/21/79     430   16.4     7.7    12.8    136.    184.    102.  **
** 3/21/79     445   16.4     7.7    12.8    135.    183.    101.  **
** 3/21/79     500   16.4     7.7    12.8    135.    183.    101.  **
** 3/21/79     515   16.4     7.7    12.8    134.    182.    100.  **
** 3/21/79     530   16.4     7.7    12.8    135.    183.    101.  **
** 3/21/79     545   16.4     7.7    12.8    134.    182.    100.  **
** 3/21/79     600   16.4     7.6    12.8    135.    183.    101.  **
** 3/21/79     615   16.4     7.7    12.8    137.    185.    102.  **
** 3/21/79     630   16.4     7.7    12.8    137.    185.    102.  **
** 3/21/79     645   16.4     7.7    12.8    135.    183.    101.  **
** 3/21/79     700   16.4     7.6    12.8    136.    184.    101.  **
** 3/21/79     715   16.4     7.7    12.8    137.    185.    102.  **
** 3/21/79     730   16.4     7.6    12.8    137.    186.    102.  **
** 3/21/79     745   16.4     7.6    12.8    139.    188.    104.  **
** 3/21/79     800   16.4     7.6    12.8    139.    187.    103.  **
** 3/21/79     815   16.4     7.6    12.8    139.    187.    103.  **
** 3/21/79     830   16.4     7.6    12.8    138.    186.    103.  **
** 3/21/79     845   16.4     7.6    12.8    139.    187.    103.  **
** 3/21/79     900   16.4     7.6    12.8    149.    200.    110.  **
** 3/21/79     915   16.4     7.6    12.7    151.    203.    112.  **
** 3/21/79     930   16.4     7.5    12.7    151.    202.    111.  **
** 3/21/79     945   16.4     7.6    12.6    152.    204.    113.  **
** 3/21/79    1000   16.4     7.6    12.6    153.    205.    113.  **
** 3/21/79    1015   16.6     7.6    12.6    148.    201.    111.  **
** 3/21/79    1030   16.6     7.6    12.5    146.    196.    108.  **
** 3/21/79    1045   16.6     7.4    12.6    149.    199.    110.  **
** 3/21/79    1100   16.6     7.3    10.2    127.    167.     92.  **
** 3/21/79    1115   16.6     7.3    10.3    128.    168.     93.  **
** 3/21/79    1130   16.6     7.2    10.3    127.    166.     92.  **
** 3/21/79    1145   16.6     7.2    10.3    123.    161.     89.  **
** 3/21/79    1200   16.6     7.2    10.3    122.    160.     88.  **
*********************************************************************
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**********************************************************************
**                           15 MIN. DATA                           **
**                  DRY STACK GAS CONCENTRATION                     **
**                                                                  **
**                               O2      CO2     NO      NO      NO **
**                      LOAD    VOL%    VOL%    PPMV    PPMV   NG/J **
**   DATE       TIME    MWTH    MEAS    MEAS    MEAS    3%O2        **
**********************************************************************
** 3/21/79      1215    16.7     7.2    10.3    121.    158.    87. **
** 3/21/79      1230    16.7     7.2    10.3    122.    159.    88. **
** 3/21/79      1245    16.7     7.2    10.4    123.    160.    88. **
** 3/21/79      1300    16.7     7.4    10.3    120.    159.    88. **
** 3/21/79      1315    16.7     7.4    10.2    114.    151.    83. **
** 3/21/79      1330    16.7     7.4    10.1    129.    172.    95. **
** 3/21/79      1345    16.7     7.3    10.2    131.    173.    95. **
** 3/21/79      1400    16.7     7.3    10.3    128.    168.    93. **
** 3/21/79      1415    16.7     7.2    10.3    129.    169.    93. **
** 3/21/79      1430    16.7     7.1    10.4    132.    170.    94. **
** 3/21/79      1445    16.7     7.0    10.4    134.    173.    95. **
** 3/21/79      1500    16.7     7.0    10.4    133.    172.    95. **
** 3/21/79      1515    16.8     7.0    10.5    133.    172.    95. **
** 3/21/79      1530    16.8     7.0    10.5    134.    173.    96. **
** 3/21/79      1545    16.8     7.0    10.5    126.    163.    90. **
** 3/21/79      1600    16.8     7.0    10.5    126.    163.    90. **
** 3/21/79      1615    16.8     7.0    10.5    127.    164.    90. **
** 3/21/79      1630    16.8     7.0    10.5    124.    160.    88. **
** 3/21/79      1645    16.8     7.0    10.5    123.    158.    87. **
** 3/21/79      1700    16.8     7.1    10.5    122.    158.    87. **
** 3/21/79      1715    16.8     7.1    10.5    122.    158.    87. **
** 3/21/79      1730    16.8     7.1    10.5    122.    158.    87. **
** 3/21/79      1745    16.8     7.1    10.4    122.    158.    87. **
** 3/21/79      1800    16.8     7.1    10.5    122.    158.    87. **
** 3/21/79      1815    16.8     7.1    10.5    122.    158.    87. **
** 3/21/79      1830    16.8     7.1    10.5    121.    157.    86. **
** 3/21/79      1845    16.8     7.1    10.5    123.    160.    88. **
** 3/21/79      1900    16.8     7.2    10.4    122.    161.    89. **
** 3/21/79      1915    16.6     8.3     9.8    127.    180.    99. **
** 3/21/79      1930    16.6     7.6    10.2    122.    164.    90. **
** 3/21/79      1945    16.6     7.6    10.1    121.    163.    90. **
** 3/21/79      2000    16.6     7.6    10.1    120.    162.    89. **
** 3/21/79      2015    16.6     7.6    10.2    120.    162.    89. **
** 3/21/79      2030    16.6     7.6    11.9    121.    163.    90. **
** 3/21/79      2045    16.6     7.6    10.2    122.    164.    90. **
** 3/21/79      2100    16.6     7.6    10.2    122.    164.    90. **
** 3/21/79      2115    16.6     7.6    10.2    121.    163.    90. **
** 3/21/79      2130    16.6     7.6    10.2    122.    164.    90. **
** 3/21/79      2145    16.6     7.6    10.2    123.    166.    91. **
** 3/21/79      2200    16.6     7.6    10.2    123.    165.    91. **
** 3/21/79      2215    16.6     7.6    10.2    123.    165.    91. **
** 3/21/79      2230    16.6     7.6    10.3    124.    166.    92. **
** 3/21/79      2245    16.6     7.6    10.3    123.    166.    91. **
** 3/21/79      2300    16.6     7.6    10.2    123.    166.    91. **
** 3/21/79      2315    16.6     7.6    10.2    123.    166.    91. **
** 3/21/79      2330    16.6     7.6    10.2    118.    160.    88. **
** 3/21/79      2345    16.6     7.6    10.2    118.    159.    88. **
** 3/21/79      2400    16.6     7.6    10.2    117.    157.    87. **
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**************************************************************************
**                          15 MIN. DATA                                **
**                  DRY STACK GAS CONCENTRATION                         **
**                                                                      **
**                           O2       CO2      NO       NO      NO      **
**                  LOAD     VOL%     VOL%     PPMV     PPMV    NG/J    **
**    DATE    TIME  MWTH     MEAS     MEAS     MEAS     3%O2            **
**************************************************************************
** 3/22/79      15  16.6      7.6     10.2     117.     157.     87.    **
** 3/22/79      30  16.6      7.6     10.2     118.     160.     88.    **
** 3/22/79      45  16.6      7.6     10.2     118.     160.     88.    **
** 3/22/79     100  16.6      7.6     10.3     117.     158.     87.    **
** 3/22/79     115  16.6      7.6     10.3     116.     156.     86.    **
** 3/22/79     130  16.6      7.6     10.3     115.     155.     86.    **
** 3/22/79     145  16.6      7.6     10.3     114.     153.     84.    **
** 3/22/79     200  16.6      7.6     10.3     113.     152.     84.    **
** 3/22/79     215  16.6      7.6     10.3     114.     153.     84.    **
** 3/22/79     230  16.6      7.6     10.3     114.     154.     85.    **
** 3/22/79     245  16.6      7.6     10.3     115.     155.     85.    **
** 3/22/79     300  16.6      7.6     10.3     115.     155.     86.    **
** 3/22/79     315  16.6      7.6     10.3     116.     157.     86.    **
** 3/22/79     330  16.6      7.6     10.2     117.     158.     87.    **
** 3/22/79     345  16.6      7.6     10.2     118.     159.     88.    **
** 3/22/79     400  16.6      7.6     10.2     117.     159.     88.    **
** 3/22/79     415  16.7      8.4      9.7     111.     160.     88.    **
** 3/22/79     430  16.7      7.9     10.0     113.     156.     86.    **
** 3/22/79     445  16.7      7.7     10.2     114.     155.     85.    **
** 3/22/79     500  16.7      7.6     10.2     114.     154.     85.    **
** 3/22/79     515  16.6      7.6     10.2     113.     153.     84.    **
** 3/22/79     530  16.6      7.7     10.2     113.     153.     84.    **
** 3/22/79     545  16.6      7.6     10.2     112.     151.     83.    **
** 3/22/79     600  16.6      7.6     10.2     111.     151.     83.    **
** 3/22/79     615  16.6      7.6     10.2     114.     154.     85.    **
** 3/22/79     630  16.6      7.6     10.2     115.     155.     86.    **
** 3/22/79     645  16.6      7.6     10.2     115.     155.     86.    **
** 3/22/79     700  16.6      7.6     10.2     115.     156.     86.    **
** 3/22/79     715  16.4      7.6     10.2     116.     156.     86.    **
** 3/22/79     730  16.4      7.6     10.2     115.     155.     86.    **
** 3/22/79     745  16.4      7.6     10.2     116.     156.     86.    **
** 3/22/79     800  16.4      7.6     10.3     117.     157.     87.    **
** 3/22/79     815  16.4      7.6     10.2     117.     158.     87.    **
** 3/22/79     830  16.4      7.6     10.2     116.     157.     87.    **
** 3/22/79     845  16.4      7.7     10.2     116.     157.     87.    **
** 3/22/79     900  16.4      7.7     10.1     127.     172.     95.    **
** 3/22/79     915  16.6      7.6     10.1     128.     173.     95.    **
** 3/22/79     930  16.6      7.6     10.1     129.     174.     96.    **
** 3/22/79     945  16.6      7.6     10.1     129.     174.     96.    **
** 3/22/79    1000  16.6      7.6     10.1     129.     174.     96.    **
** 3/22/79    1015  16.4      7.6     10.1     129.     174.     96.    **
** 3/22/79    1030  16.4      7.6     10.2     129.     173.     95.    **
** 3/22/79    1045  16.4      7.6     10.1     125.     168.     93.    **
** 3/22/79    1100  16.4      7.6     10.0     126.     169.     93.    **
** 3/22/79    1115  16.4      7.6     10.0     127.     171.     94.    **
** 3/22/79    1130  16.4      7.6     10.1     127.     171.     94.    **
** 3/22/79    1145  16.4      7.6     10.1     128.     174.     96.    **
** 3/22/79    1200  16.4      7.6     10.1     129.     173.     96.    **
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*************************************************************************
**                          15 MIN. DATA                               **
**                  DRY STACK GAS CONCENTRATION                        **
**                                                                     **
**                            O2      CO2      NO      NO       NO     **
**                    LOAD    VOL%    VOL%     PPMV    PPMV     NG/J   **
**   DATE     TIME    MWTH    MEAS    MEAS     MEAS    3%O2            **
*************************************************************************
** 3/22/79    1215    16.4     7.6    10.0     129.    173.      96.   **
** 3/22/79    1230    16.4     7.6    10.0     129.    173.      96.   **
** 3/22/79    1245    16.4     7.6    10.0     124.    167.      92.   **
** 3/22/79    1300    16.4     7.6    10.1     125.    168.      93.   **
** 3/22/79    1315    16.6     7.6    10.1     127.    170.      94.   **
** 3/22/79    1330    16.6     7.6    10.1     127.    170.      94.   **
** 3/22/79    1345    16.6     7.5    10.1     127.    170.      94.   **
** 3/22/79    1400    16.6     7.5    10.1     127.    169.      93.   **
** 3/22/79    1415    16.6     7.5    10.1     128.    171.      94.   **
** 3/22/79    1430    16.6     7.5    10.1     128.    171.      94.   **
** 3/22/79    1445    16.6     7.4    10.2     125.    167.      92.   **
** 3/22/79    1500    16.6     7.4    10.1     122.    163.      90.   **
** 3/22/79    1515    16.6     7.4    10.1     122.    162.      90.   **
** 3/22/79    1530    16.6     7.4    10.1     122.    162.      89.   **
** 3/22/79    1545    16.6     7.4    10.1     122.    162.      89.   **
** 3/22/79    1600    16.6     7.4    10.1     122.    162.      89.   **
** 3/22/79    1615    16.6     7.4    10.1     122.    163.      90.   **
** 3/22/79    1630    16.6     7.4    10.2     123.    164.      90.   **
** 3/22/79    1645    16.6     7.5    10.2     124.    165.      91.   **
** 3/22/79    1700    16.6     7.5    10.2     124.    165.      91.   **
** 3/22/79    1715    16.6     7.5    10.2     124.    166.      91.   **
** 3/22/79    1730    16.6     7.5    10.1     126.    168.      93.   **
** 3/22/79    1745    16.6     7.5    10.1     128.    170.      94.   **
** 3/22/79    1800    16.6     7.5    10.1     129.    172.      95.   **
** 3/22/79    1815    16.6     7.5    10.1     130.    174.      96.   **
** 3/22/79    1830    16.6     7.5    10.2     129.    173.      95.   **
** 3/22/79    1845    16.6     7.5    10.2     128.    171.      94.   **
** 3/22/79    1900    16.6     7.5    10.2     128.    171.      94.   **
** 3/22/79    1915    17.0     7.5    10.2     126.    168.      93.   **
** 3/22/79    1930    17.0     8.2     9.6     130.    183.     101.   **
** 3/22/79    1945    17.0     7.7    10.1     123.    167.      92.   **
** 3/22/79    2000    17.0     7.7    10.1     121.    164.      91.   **
** 3/22/79    2015    16.6     7.7    10.1     121.    163.      90.   **
** 3/22/79    2030    16.6     7.7    10.1     120.    163.      90.   **
** 3/22/79    2045    16.6     7.7    10.1     121.    164.      90.   **
** 3/22/79    2100    16.6     7.7    10.1     121.    163.      90.   **
** 3/22/79    2115    16.6     7.7    10.1     120.    163.      90.   **
** 3/22/79    2130    16.6     7.7    10.1     119.    162.      89.   **
** 3/22/79    2145    16.6     7.7    10.1     120.    162.      89.   **
** 3/22/79    2200    16.6     7.7    10.1     119.    162.      89.   **
** 3/22/79    2215    16.6     7.7    10.1     119.    162.      90.   **
** 3/22/79    2230    16.6     7.7    10.1     119.    162.      89.   **
** 3/22/79    2245    16.6     7.7    10.1     119.    162.      90.   **
** 3/22/79    2300    16.6     7.7    10.1     119.    162.      89.   **
** 3/22/79    2315    16.6     7.7    10.1     119.    161.      89.   **
** 3/22/79    2330    16.6     7.7    10.1     116.    158.      87.   **
** 3/22/79    2345    16.6     7.7    10.1     116.    157.      86.   **
** 3/22/79    2400    16.6     7.7    10.1     116.    158.      87.   **
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
3/23/79	15	16.4	7.7	10.1	115.	156.	86.
3/23/79	30	16.4	7.7	10.1	116.	157.	87.
3/23/79	45	16.4	7.7	10.1	115.	156.	86.
3/23/79	100	16.4	7.7	10.1	115.	156.	86.
3/23/79	115	16.4	7.7	10.1	115.	156.	86.
3/23/79	130	16.4	7.7	10.1	115.	156.	86.
3/23/79	145	16.4	7.7	10.1	115.	156.	86.
3/23/79	200	16.4	7.7	10.1	115.	157.	86.
3/23/79	215	16.4	7.7	10.1	115.	157.	86.
3/23/79	230	16.4	7.7	10.1	115.	157.	86.
3/23/79	245	16.4	7.7	10.1	114.	155.	86.
3/23/79	300	16.4	7.7	10.1	114.	155.	85.
3/23/79	315	16.4	7.7	10.1	113.	154.	85.
3/23/79	330	16.4	7.7	10.1	112.	152.	84.
3/23/79	345	16.4	7.7	10.1	111.	151.	83.
3/23/79	400	16.4	7.7	10.1	111.	150.	83.
3/23/79	415	16.3	8.8	9.3	101.	149.	82.
3/23/79	430	16.3	7.7	10.1	107.	145.	80.
3/23/79	445	16.3	7.6	10.2	107.	145.	80.
3/23/79	500	16.3	7.6	10.2	107.	144.	79.
3/23/79	515	16.4	7.6	10.2	106.	143.	79.
3/23/79	530	16.4	7.6	10.2	106.	143.	79.
3/23/79	545	16.4	7.6	10.2	106.	143.	79.
3/23/79	600	16.4	7.6	10.2	106.	143.	79.
3/23/79	615	16.4	7.7	10.1	108.	147.	81.
3/23/79	630	16.4	7.7	10.1	109.	147.	81.
3/23/79	645	16.4	7.7	10.1	108.	147.	81.
3/23/79	700	16.4	7.7	10.1	109.	148.	81.
3/23/79	715	16.4	7.7	10.1	109.	148.	81.
3/23/79	730	16.4	7.7	10.1	109.	147.	81.
3/23/79	745	16.4	7.7	10.1	109.	148.	82.
3/23/79	800	16.4	7.7	10.1	109.	148.	82.
3/23/79	815	16.3	7.7	10.1	110.	150.	83.
3/23/79	830	16.3	7.7	10.1	112.	152.	84.
3/23/79	845	16.3	7.7	10.1	112.	152.	84.
3/23/79	900	16.3	7.7	10.1	111.	151.	83.
3/23/79	915	16.3	7.7	10.1	112.	152.	84.
3/23/79	930	16.3	7.7	10.1	112.	152.	84.
3/23/79	945	16.3	7.7	10.1	115.	156.	86.
3/23/79	1000	16.3	7.7	10.1	115.	155.	86.
3/23/79	1015	16.3	7.6	10.1	116.	156.	86.
3/23/79	1030	16.3	7.6	10.1	114.	154.	85.
3/23/79	1045	16.3	7.6	10.1	115.	155.	86.
3/23/79	1100	16.3	7.4	10.2	126.	168.	92.
3/23/79	1115	16.1	7.4	10.1	128.	169.	93.
3/23/79	1130	16.1	7.2	10.2	129.	169.	93.
3/23/79	1145	16.1	7.1	10.3	131.	171.	94.
3/23/79	1200	16.1	7.2	10.3	134.	175.	97.

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**************************************************************************
**                                                                      **
**                           15 MIN. DATA                               **
**                  DRY STACK GAS CONCENTRATION                         **
**                                                                      **
**                              O2      CO2      NO      NO             **
**                     LOAD    VOL%    VOL%     PPMV    PPMV     NO     **
**    DATE     TIME    MWTH    MEAS    MEAS     MEAS    3%O2    NG/J    **
**************************************************************************
** 3/23/79     1215    16.7     7.2    10.3     135.    177.     97.    **
** 3/23/79     1230    16.7     7.2    10.2     134.    176.     97.    **
** 3/23/79     1245    16.7     7.3    10.2     124.    163.     90.    **
** 3/23/79     1300    16.7     7.3    10.2     124.    163.     90.    **
** 3/23/79     1315    16.8     7.2    10.3     125.    164.     90.    **
** 3/23/79     1330    16.8     7.2    10.2     129.    169.     93.    **
** 3/23/79     1345    16.8     7.2    10.3     130.    170.     94.    **
** 3/23/79     1400    16.8     7.1    10.3     129.    168.     93.    **
** 3/23/79     1415    16.7     7.2    10.3     128.    168.     92.    **
** 3/23/79     1430    16.7     7.2    10.3     127.    166.     91.    **
** 3/23/79     1445    16.7     7.1    10.3     126.    164.     90.    **
** 3/23/79     1500    16.7     7.1    10.4     125.    163.     90.    **
** 3/23/79     1515    16.7     7.1    10.3     124.    162.     89.    **
** 3/23/79     1530    16.7     7.1    10.3     123.    160.     88.    **
** 3/23/79     1545    16.7     7.1    10.3     124.    161.     89.    **
** 3/23/79     1600    16.7     7.1    10.4     122.    159.     88.    **
** 3/23/79     1615    16.6     7.3    10.3     123.    162.     89.    **
** 3/23/79     1630    16.6     7.3    10.2     122.    162.     89.    **
** 3/23/79     1645    16.6     7.3    10.2     122.    162.     89.    **
** 3/23/79     1700    16.6     7.3    10.2     121.    159.     88.    **
** 3/23/79     1715    16.6     7.3    10.2     121.    160.     88.    **
** 3/23/79     1730    16.6     7.3    10.2     120.    158.     87.    **
** 3/23/79     1745    16.6     7.4    10.2     120.    159.     87.    **
** 3/23/79     1800    16.6     7.4    10.2     119.    157.     87.    **
** 3/23/79     1815    16.6     7.3    10.1     118.    156.     86.    **
** 3/23/79     1830    16.6     7.3    10.2     118.    156.     86.    **
** 3/23/79     1845    16.6     7.3    10.2     117.    154.     85.    **
** 3/23/79     1900    16.6     7.4    10.2     118.    156.     86.    **
** 3/23/79     1915    16.7     7.7     9.9     116.    158.     87.    **
** 3/23/79     1930    16.7     8.2     9.6     124.    174.     96.    **
** 3/23/79     1945    16.7     7.9     9.7     124.    172.     95.    **
** 3/23/79     2000    16.7     8.0     9.7     124.    172.     95.    **
** 3/23/79     2015    16.6     8.0     9.7     126.    174.     96.    **
** 3/23/79     2030    16.6     8.0     9.7     125.    173.     95.    **
** 3/23/79     2045    16.6     7.9     9.7     124.    171.     94.    **
** 3/23/79     2100    16.6     7.9     9.7     122.    169.     93.    **
** 3/23/79     2115    16.6     8.0     9.7     121.    168.     93.    **
** 3/23/79     2130    16.6     7.9     9.7     122.    169.     93.    **
** 3/23/79     2145    16.6     7.9     9.7     123.    170.     94.    **
** 3/23/79     2200    16.6     7.9     9.7     123.    170.     94.    **
** 3/23/79     2215    16.6     7.9     9.7     123.    170.     94.    **
** 3/23/79     2230    16.6     7.9     9.7     124.    171.     94.    **
** 3/23/79     2245    16.6     7.9     9.7     123.    170.     94.    **
** 3/23/79     2300    16.6     7.9     9.7     123.    169.     93.    **
** 3/23/79     2315    16.6     8.0     9.7     126.    174.     96.    **
** 3/23/79     2330    16.6     7.9     9.7     126.    174.     96.    **
** 3/23/79     2345    16.6     8.0     9.7     126.    174.     96.    **
** 3/23/79     2400    16.6     7.9     9.7     126.    173.     96.    **
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
3/24/79	15	16.4	7.9	9.7	125.	173.	95.
3/24/79	30	16.4	7.9	9.7	124.	172.	95.
3/24/79	45	16.4	7.9	9.7	125.	173.	95.
3/24/79	100	16.4	7.9	9.7	125.	172.	95.
3/24/79	115	16.4	7.9	9.7	124.	170.	94.
3/24/79	130	16.4	7.9	9.7	124.	170.	94.
3/24/79	145	16.4	7.8	9.7	124.	170.	94.
3/24/79	200	16.4	7.9	9.9	124.	170.	94.
3/24/79	215	16.4	7.9	9.7	125.	171.	94.
3/24/79	230	16.4	7.9	9.7	125.	171.	95.
3/24/79	245	16.4	7.9	9.7	126.	174.	96.
3/24/79	300	16.4	7.8	9.7	127.	174.	96.
3/24/79	315	16.4	7.9	9.7	129.	178.	98.
3/24/79	330	16.4	7.9	9.7	129.	178.	98.
3/24/79	345	16.4	7.9	9.7	128.	177.	97.
3/24/79	400	16.4	7.9	9.7	128.	177.	98.
3/24/79	415	16.4	8.5	9.1	129.	187.	103.
3/24/79	430	16.4	7.9	9.6	127.	175.	97.
3/24/79	445	16.4	7.7	9.8	128.	173.	95.
3/24/79	500	16.4	7.7	9.9	128.	173.	95.
3/24/79	515	16.4	7.6	9.9	127.	172.	95.
3/24/79	530	16.4	7.7	9.9	126.	171.	94.
3/24/79	545	16.4	7.6	9.8	126.	171.	94.
3/24/79	600	16.4	7.7	9.8	126.	171.	94.
3/24/79	615	16.4	7.6	9.8	127.	171.	94.
3/24/79	630	16.4	7.7	9.8	127.	172.	95.
3/24/79	645	16.4	7.7	9.8	126.	171.	94.
3/24/79	700	16.4	7.7	9.8	126.	171.	94.
3/24/79	715	16.4	7.7	9.8	126.	172.	95.
3/24/79	730	16.4	7.7	9.8	127.	172.	95.
3/24/79	745	16.4	7.6	9.9	128.	173.	95.
3/24/79	800	16.4	7.6	9.9	128.	173.	95.
3/24/79	815	16.4	7.6	9.9	128.	173.	95.
3/24/79	830	16.4	7.6	9.9	127.	171.	94.
3/24/79	845	16.4	7.7	10.0	125.	169.	93.
3/24/79	900	16.4	7.7	9.9	121.	163.	90.
3/24/79	915	16.4	7.6	9.9	116.	156.	86.
3/24/79	930	16.4	7.6	10.0	116.	157.	87.
3/24/79	945	16.4	7.7	9.8	120.	163.	90.
3/24/79	1000	16.4	7.7	9.7	123.	167.	92.
3/24/79	1015	16.4	7.8	9.7	124.	169.	93.
3/24/79	1030	16.4	7.8	9.7	125.	171.	94.
3/24/79	1045	16.4	7.8	9.7	125.	171.	94.
3/24/79	1100	16.4	7.8	9.7	125.	171.	94.
3/24/79	1115	16.3	7.8	9.7	125.	172.	95.
3/24/79	1130	16.3	7.8	9.7	127.	174.	96.
3/24/79	1145	16.3	7.8	9.7	126.	173.	95.
3/24/79	1200	16.3	7.8	9.7	125.	171.	95.

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**                            15 MIN. DATA                            **
**                    DRY STACK GAS CONCENTRATION                     **
**                                                                    **
**                           O2       CO2      NO      NO      NO     **
**                   LOAD    VOL%     VOL%     PPMV    PPMV    NG/J   **
**   DATE     TIME   MWTH    MEAS     MEAS     MEAS    3%O2           **
************************************************************************
** 3/24/79    1215   16.3     7.8      9.7    127.    174.     96.    **
** 3/24/79    1230   16.3     7.9      9.7    127.    174.     96.    **
** 3/24/79    1245   16.3     7.8      9.7    126.    172.     95.    **
** 3/24/79    1300   16.3     7.8      9.7    127.    174.     96.    **
** 3/24/79    1315   16.1     7.9      9.7    133.    182.    101.    **
** 3/24/79    1330   16.1     7.9      9.8    132.    181.    100.    **
** 3/24/79    1345   16.1     7.9      9.8    131.    180.     99.    **
** 3/24/79    1400   16.1     7.8      9.9    130.    178.     98.    **
** 3/24/79    1415   16.1     7.8      9.9    132.    180.     99.    **
** 3/24/79    1430   16.1     7.8      9.9    132.    180.     99.    **
** 3/24/79    1445   16.1     7.7      9.9    132.    180.     99.    **
** 3/24/79    1500   16.1     7.7      9.9    134.    182.    101.    **
** 3/24/79    1515   16.1     7.8      9.9    135.    185.    102.    **
** 3/24/79    1530   16.1     7.8      9.9    135.    185.    102.    **
** 3/24/79    1545   16.1     7.8      9.9    135.    185.    102.    **
** 3/24/79    1600   16.1     7.8      9.9    135.    184.    102.    **
** 3/24/79    1615   16.1     7.8      9.9    136.    186.    103.    **
** 3/24/79    1630   16.1     7.8      9.9    136.    187.    103.    **
** 3/24/79    1645   16.1     7.9      9.9    138.    189.    104.    **
** 3/24/79    1700   16.1     7.9      9.9    138.    189.    104.    **
** 3/24/79    1715   16.3     7.8      9.9    138.    189.    104.    **
** 3/24/79    1730   16.3     7.8      9.9    137.    187.    103.    **
** 3/24/79    1745   16.3     7.9      9.9    136.    187.    103.    **
** 3/24/79    1800   16.3     7.9      9.9    137.    188.    104.    **
** 3/24/79    1815   16.3     7.9      9.9    135.    186.    103.    **
** 3/24/79    1830   16.3     7.9      9.9    135.    186.    103.    **
** 3/24/79    1845   16.3     7.9      9.9    134.    186.    102.    **
** 3/24/79    1900   16.3     7.9      9.9    132.    183.    101.    **
** 3/24/79    1915   18.2     7.8     10.0    158.    217.    119.    **
** 3/24/79    1930   18.2     8.6      9.3    181.    263.    145.    **
** 3/24/79    1945   18.2     8.6      9.3    181.    263.    145.    **
** 3/24/79    2000   18.2     8.6      9.3    182.    265.    146.    **
** 3/24/79    2015   16.4     8.2      9.7    147.    207.    114.    **
** 3/24/79    2030   16.4     8.2      9.6    136.    193.    106.    **
** 3/24/79    2045   16.4     8.2      9.6    136.    192.    106.    **
** 3/24/79    2100   16.4     8.2      9.6    136.    192.    106.    **
** 3/24/79    2115   16.4     8.2      9.6    135.    192.    106.    **
** 3/24/79    2130   16.4     8.2      9.6    135.    192.    106.    **
** 3/24/79    2145   16.4     8.2      9.6    137.    194.    107.    **
** 3/24/79    2200   16.4     8.2      9.6    137.    194.    107.    **
** 3/24/79    2215   16.4     8.2      9.7    137.    195.    107.    **
** 3/24/79    2230   16.4     8.3      9.7    139.    197.    109.    **
** 3/24/79    2245   16.4     8.3      9.6    139.    197.    109.    **
** 3/24/79    2300   16.4     8.3      9.6    141.    200.    110.    **
** 3/24/79    2315   16.4     8.3      9.7    142.    201.    111.    **
** 3/24/79    2330   16.4     8.2      9.7    140.    198.    109.    **
** 3/24/79    2345   16.4     8.2      9.6    141.    199.    110.    **
** 3/24/79    2400   16.4     8.3      9.6    141.    200.    110.    **
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**                          15 MIN. DATA                                 **
**                   DRY STACK GAS CONCENTRATION                         **
**                                                                       **
**                          O2      CO2      NO      NO       NO         **
**                  LOAD    VOL%    VOL%     PPMV    PPMV     NG/J       **
**   DATE     TIME  MWTH    MEAS    MEAS     MEAS    3%O2                **
**************************************************************************
** 3/25/79      15  16.4     8.3     9.6     140.    199.     110.       **
** 3/25/79      30  16.4     8.3     9.7     139.    198.     109.       **
** 3/25/79      45  16.4     8.3     9.7     139.    197.     109.       **
** 3/25/79     100  16.4     8.3     9.7     141.    200.     110.       **
** 3/25/79     115  16.4     8.4     9.7     141.    202.     111.       **
** 3/25/79     130  16.4     8.4     9.7     142.    203.     112.       **
** 3/25/79     145  16.4     8.4     9.6     141.    202.     112.       **
** 3/25/79     200  16.4     8.4     9.7     141.    201.     111.       **
** 3/25/79     215  16.4     8.4     9.7     140.    201.     111.       **
** 3/25/79     230  16.4     8.4     9.7     139.    198.     109.       **
** 3/25/79     245  16.4     8.4     9.7     138.    197.     109.       **
** 3/25/79     300  16.4     8.4     9.7     138.    198.     109.       **
** 3/25/79     315  16.4     8.4     9.7     138.    198.     109.       **
** 3/25/79     330  16.4     8.4     9.7     139.    198.     109.       **
** 3/25/79     345  16.4     8.4     9.7     139.    199.     110.       **
** 3/25/79     400  16.4     8.4     9.7     139.    198.     109.       **
** 3/25/79     415  16.3     9.3     9.1     134.    207.     114.       **
** 3/25/79     430  16.3     8.7     9.5     141.    207.     114.       **
** 3/25/79     445  16.3     8.7     9.5     142.    208.     114.       **
** 3/25/79     500  16.3     8.6     9.5     141.    206.     114.       **
** 3/25/79     515  16.4     8.6     9.5     141.    206.     114.       **
** 3/25/79     530  16.4     8.7     9.5     140.    205.     113.       **
** 3/25/79     545  16.4     8.6     9.5     138.    202.     111.       **
** 3/25/79     600  16.4     8.6     9.5     136.    199.     110.       **
** 3/25/79     615  16.4     8.6     9.5     136.    199.     110.       **
** 3/25/79     630  16.4     8.6     9.5     138.    202.     111.       **
** 3/25/79     645  16.4     8.6     9.5     139.    203.     112.       **
** 3/25/79     700  16.4     8.6     9.5     140.    205.     113.       **
** 3/25/79     715  16.4     8.5     9.5     138.    201.     111.       **
** 3/25/79     730  16.4     8.5     9.5     135.    195.     108.       **
** 3/25/79     745  16.4     8.5     9.5     134.    194.     107.       **
** 3/25/79     800  16.4     8.5     9.5     132.    192.     106.       **
** 3/25/79     815  16.3     8.6     9.5     131.    191.     106.       **
** 3/25/79     830  16.3     8.6     9.5     131.    191.     105.       **
** 3/25/79     845  16.3     8.6     9.5     130.    191.     105.       **
** 3/25/79     900  16.3     8.7     9.5     131.    192.     106.       **
** 3/25/79     915  16.3     8.7     9.5     131.    191.     106.       **
** 3/25/79     930  16.3     8.7     9.5     130.    190.     105.       **
** 3/25/79     945  16.3     8.7     9.5     129.    189.     104.       **
** 3/25/79    1000  16.3     8.6     9.5     129.    189.     104.       **
** 3/25/79    1015  16.3     8.6     9.5     128.    188.     104.       **
** 3/25/79    1030  16.3     8.6     9.5     129.    189.     104.       **
** 3/25/79    1045  16.3     8.6     9.5     130.    191.     105.       **
** 3/25/79    1100  16.3     8.7     9.5     130.    190.     105.       **
** 3/25/79    1115  16.1     8.7     9.5     131.    192.     106.       **
** 3/25/79    1130  16.1     8.7     9.5     131.    192.     106.       **
** 3/25/79    1145  16.1     8.7     9.5     132.    194.     107.       **
** 3/25/79    1200  16.1     8.7     9.5     133.    195.     108.       **
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
3/25/79	1215	16.1	8.7	9.5	134.	197.	108.
3/25/79	1230	16.1	8.7	9.5	134.	197.	109.
3/25/79	1245	16.1	8.7	9.5	134.	197.	109.
3/25/79	1300	16.1	8.7	9.5	133.	195.	107.
3/25/79	1315	16.1	8.7	9.5	133.	195.	107.
3/25/79	1330	16.1	8.7	9.5	133.	195.	107.
3/25/79	1345	16.1	8.5	9.5	135.	196.	108.
3/25/79	1400	16.1	8.3	9.5	138.	196.	108.
3/25/79	1415	16.3	8.4	9.4	136.	196.	108.
3/25/79	1430	16.3	8.4	9.4	136.	196.	108.
3/25/79	1445	16.3	8.4	9.4	135.	194.	107.
3/25/79	1500	16.3	8.4	9.4	136.	196.	108.
3/25/79	1515	16.3	8.4	9.4	137.	197.	108.
3/25/79	1530	16.3	8.4	9.5	138.	198.	109.
3/25/79	1545	16.3	8.4	9.5	138.	197.	109.
3/25/79	1600	16.3	8.3	9.5	139.	198.	109.
3/25/79	1615	16.3	8.4	9.5	140.	199.	110.
3/25/79	1630	16.3	8.4	9.5	139.	199.	110.
3/25/79	1645	16.3	8.4	9.5	137.	197.	109.
3/25/79	1700	16.3	8.4	9.5	137.	197.	108.
3/25/79	1715	16.3	8.4	9.5	137.	196.	108.
3/25/79	1730	16.3	8.5	9.5	138.	199.	110.
3/25/79	1745	16.3	8.5	9.5	138.	198.	109.
3/25/79	1800	16.3	8.5	9.5	138.	198.	109.
3/25/79	1815	16.3	8.5	9.5	138.	198.	109.
3/25/79	1830	16.3	8.5	9.5	136.	196.	108.
3/25/79	1845	16.3	8.5	9.5	136.	195.	108.
3/25/79	1900	16.3	8.5	9.5	136.	195.	108.
3/25/79	1915	16.1	8.5	9.5	135.	194.	107.
3/25/79	1930	16.1	8.5	9.4	134.	194.	107.
3/25/79	1945	16.1	8.5	9.4	132.	192.	106.
3/25/79	2000	16.1	8.2	9.7	132.	186.	103.
3/25/79	2015	16.4	8.2	9.8	130.	184.	101.
3/25/79	2030	16.4	8.1	9.8	131.	183.	101.
3/25/79	2045	16.4	8.2	9.8	131.	185.	102.
3/25/79	2100	16.4	8.2	9.8	130.	184.	101.
3/25/79	2115	16.4	8.2	9.8	130.	183.	101.
3/25/79	2130	16.4	8.2	9.8	131.	184.	102.
3/25/79	2145	16.4	8.2	9.8	132.	186.	103.
3/25/79	2200	16.4	8.2	9.8	133.	187.	103.
3/25/79	2215	16.4	8.2	9.7	132.	187.	103.
3/25/79	2230	16.4	8.2	9.7	130.	183.	101.
3/25/79	2245	16.4	8.2	9.7	130.	183.	101.
3/25/79	2300	16.4	8.2	9.7	130.	184.	101.
3/25/79	2315	16.4	8.2	9.7	132.	186.	103.
3/25/79	2330	16.4	8.1	9.7	133.	187.	103.
3/25/79	2345	16.4	8.1	9.7	135.	189.	104.
3/25/79	2400	16.4	8.1	9.7	135.	189.	104.

```
******************************************************************************
**                                                                          **
**                             15 MIN. DATA                                 **
**                     DRY STACK GAS CONCENTRATION                          **
**                                                                          **
**                              O2      CO2      NO       NO       NO       **
**                      LOAD   VOL%     VOL%    PPMV     PPMV     NG/J      **
**    DATE      TIME    MWTH   MEAS     MEAS    MEAS     3%O2               **
******************************************************************************
** 3/26/79        15    16.4    8.1      9.7    137.     192.     106.      **
** 3/26/79        30    16.4    8.1      9.7    137.     192.     106.      **
** 3/26/79        45    16.4    8.1      9.7    139.     195.     108.      **
** 3/26/79       100    16.4    8.1      9.7    140.     197.     109.      **
** 3/26/79       115    16.4    8.1      9.7    141.     198.     109.      **
** 3/26/79       130    16.4    8.1      9.7    141.     198.     109.      **
** 3/26/79       145    16.4    8.1      9.6    139.     195.     108.      **
** 3/26/79       200    16.4    8.1      9.6    139.     195.     108.      **
** 3/26/79       215    16.4    8.1      9.7    140.     196.     108.      **
** 3/26/79       230    16.4    8.1      9.7    140.     197.     108.      **
** 3/26/79       245    16.4    8.1      9.7    140.     196.     108.      **
** 3/26/79       300    16.4    8.1      9.7    140.     197.     109.      **
** 3/26/79       315    16.4    8.1      9.7    140.     196.     108.      **
** 3/26/79       330    16.4    8.1      9.7    140.     196.     108.      **
** 3/26/79       345    16.4    8.1      9.7    139.     195.     107.      **
** 3/26/79       400    16.4    8.1      9.7    139.     195.     108.      **
** 3/26/79       415    16.4    9.1      8.8    143.     217.     120.      **
** 3/26/79       430    16.4    8.7      9.3    143.     211.     116.      **
** 3/26/79       445    16.4    8.7      9.3    144.     212.     117.      **
** 3/26/79       500    16.4    8.7      9.3    146.     214.     118.      **
** 3/26/79       515    16.4    8.5      9.4    144.     209.     115.      **
** 3/26/79       530    16.4    8.5      9.5    144.     207.     114.      **
** 3/26/79       545    16.4    8.5      9.5    144.     208.     115.      **
** 3/26/79       600    16.4    8.5      9.5    144.     207.     114.      **
** 3/26/79       615    16.4    8.4      9.5    144.     206.     114.      **
** 3/26/79       630    16.4    8.3      9.7    141.     200.     110.      **
** 3/26/79       645    16.4    8.3      9.7    142.     202.     111.      **
** 3/26/79       700    16.4    8.3      9.7    142.     202.     112.      **
** 3/26/79       715    16.4    8.3      9.7    142.     201.     111.      **
** 3/26/79       730    16.4    8.3      9.7    142.     201.     111.      **
** 3/26/79       745    16.4    8.3      9.7    142.     202.     111.      **
** 3/26/79       800    16.4    8.2      9.7    143.     203.     112.      **
** 3/26/79       815    16.4    8.3      9.7    143.     203.     112.      **
** 3/26/79       830    16.4    8.3      9.7    142.     202.     111.      **
** 3/26/79       845    16.4    8.3      9.7    143.     203.     112.      **
** 3/26/79       900    16.4    8.3      9.7    144.     205.     113.      **
** 3/26/79       915    16.3    8.3      9.7    144.     205.     113.      **
** 3/26/79       930    16.3    8.2      9.7    139.     196.     108.      **
** 3/26/79       945    16.3    8.0      9.7    133.     185.     102.      **
** 3/26/79      1000    16.3    8.1      9.7    132.     184.     101.      **
** 3/26/79      1015    16.1    8.6      9.5    128.     186.     103.      **
** 3/26/79      1030    16.1    8.5      9.4    129.     186.     103.      **
** 3/26/79      1045    16.1    8.2      9.6    129.     181.     100.      **
** 3/26/79      1100    16.1    8.1      9.7    131.     183.     101.      **
** 3/26/79      1115    16.3    8.0      9.7    132.     183.     101.      **
** 3/26/79      1130    16.3    8.0      9.7    136.     189.     104.      **
** 3/26/79      1145    16.3    8.0      9.8    137.     190.     105.      **
** 3/26/79      1200    16.3    8.1      9.8    137.     192.     106.      **
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15 MIN, DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
3/26/79	1215	16.4	8.0	9.6	137.	191.	105.
3/26/79	1230	16.4	8.0	9.8	137.	190.	105.
3/26/79	1245	16.4	8.0	9.8	137.	190.	105.
3/26/79	1300	16.4	8.0	9.9	128.	178.	98.
3/26/79	1315	16.4	8.0	9.9	121.	168.	93.
3/26/79	1330	16.4	8.1	9.8	128.	180.	99.
3/26/79	1345	16.4	8.0	9.7	135.	189.	104.
3/26/79	1400	16.4	8.0	9.7	139.	193.	106.
3/26/79	1415	16.4	7.6	9.9	133.	180.	99.
3/26/79	1430	16.4	7.5	10.1	127.	169.	93.
3/26/79	1445	16.4	7.5	10.1	127.	170.	94.
3/26/79	1500	16.4	7.5	10.1	128.	172.	95.
3/26/79	1515	16.6	7.6	10.1	127.	170.	94.
3/26/79	1530	16.6	7.5	10.1	128.	171.	94.
3/26/79	1545	16.6	7.6	10.1	129.	173.	96.
3/26/79	1600	16.6	7.6	10.1	129.	174.	96.
3/26/79	1615	16.6	7.5	10.1	127.	170.	94.
3/26/79	1630	16.6	7.5	10.1	126.	168.	92.
3/26/79	1645	16.6	7.5	10.1	123.	164.	91.
3/26/79	1700	16.6	7.5	10.1	126.	169.	93.
3/26/79	1715	16.6	7.5	10.2	125.	167.	92.
3/26/79	1730	16.6	7.5	10.2	125.	168.	92.
3/26/79	1745	16.6	7.5	10.2	126.	168.	93.
3/26/79	1800	16.6	7.5	10.2	125.	167.	92.
3/26/79	1815	16.6	7.5	10.2	124.	166.	91.
3/26/79	1830	16.6	7.5	10.2	123.	165.	91.
3/26/79	1845	16.6	7.6	10.2	121.	162.	89.
3/26/79	1900	16.6	7.6	10.2	118.	158.	87.
3/26/79	1915	16.6	7.5	10.2	120.	161.	89.
3/26/79	1930	16.6	7.6	10.2	123.	166.	91.
3/26/79	1945	16.6	8.7	9.4	125.	184.	101.
3/26/79	2000	16.6	7.9	10.0	123.	169.	93.
3/26/79	2015	16.6	7.8	10.1	123.	168.	93.
3/26/79	2030	16.6	7.7	10.2	122.	165.	91.
3/26/79	2045	16.6	7.6	10.3	120.	161.	89.
3/26/79	2100	16.6	7.4	10.4	118.	157.	87.
3/26/79	2115	16.6	7.6	10.5	119.	161.	89.
3/26/79	2130	16.6	7.8	10.1	121.	166.	91.
3/26/79	2145	16.6	7.8	10.1	121.	165.	91.
3/26/79	2200	16.6	7.9	10.1	120.	165.	91.
3/26/79	2215	16.7	7.6	10.3	119.	160.	88.
3/26/79	2230	16.7	7.5	10.4	120.	161.	89.
3/26/79	2245	16.7	7.5	10.4	118.	158.	87.
3/26/79	2300	16.7	7.6	10.4	118.	159.	88.
3/26/79	2315	16.4	7.7	10.4	119.	161.	89.
3/26/79	2330	16.4	7.7	10.3	120.	162.	90.
3/26/79	2345	16.4	7.7	10.3	119.	161.	89.
3/26/79	2400	16.4	7.7	10.3	119.	161.	89.

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**********************************************************************
**                          15 MIN, DATA                            **
**                  DRY STACK GAS CONCENTRATION                     **
**                                                                  **
**                          O2      CO2      NO      NO      NO     **
**                  LOAD    VOL%    VOL%     PPMV    PPMV    NG/J   **
**   DATE     TIME  MWTH    MEAS    MEAS     MEAS    3%O2           **
**********************************************************************
** 3/27/79      15  16.7     7.7    10.3     119.    161.     89.   **
** 3/27/79      30  16.7     7.7    10.3     117.    158.     87.   **
** 3/27/79      45  16.7     7.6    10.3     117.    157.     87.   **
** 3/27/79     100  16.7     7.6    10.3     116.    157.     87.   **
** 3/27/79     115  16.7     7.7    10.3     117.    159.     88.   **
** 3/27/79     130  16.7     7.7    10.3     117.    158.     87.   **
** 3/27/79     145  16.7     7.7    10.3     115.    156.     86.   **
** 3/27/79     200  16.7     7.7    10.3     115.    156.     86.   **
** 3/27/79     215  16.7     7.8    10.3     112.    153.     84.   **
** 3/27/79     230  16.7     7.6    10.3     104.    140.     77.   **
** 3/27/79     245  16.7     7.3    10.6      99.    130.     72.   **
** 3/27/79     300  16.7     7.3    10.6     100.    132.     73.   **
** 3/27/79     315  16.7     7.3    10.6     101.    133.     73.   **
** 3/27/79     330  16.7     7.3    10.6     102.    135.     74.   **
** 3/27/79     345  16.7     7.3    10.7     103.    136.     75.   **
** 3/27/79     400  16.7     7.3    10.7     103.    135.     74.   **
** 3/27/79     415  16.6     8.6     9.8     108.    158.     87.   **
** 3/27/79     430  16.6     7.7    10.4     105.    143.     79.   **
** 3/27/79     445  16.6     7.6    10.4     105.    142.     78.   **
** 3/27/79     500  16.6     7.8    10.3     106.    146.     80.   **
** 3/27/79     515  16.6     7.9    10.3     107.    148.     82.   **
** 3/27/79     530  16.6     7.9    10.3     107.    147.     81.   **
** 3/27/79     545  16.6     7.9    10.3     106.    146.     81.   **
** 3/27/79     600  16.6     7.9    10.3     106.    146.     81.   **
** 3/27/79     615  16.6     7.9    10.3     106.    146.     81.   **
** 3/27/79     630  16.6     7.9    10.3     106.    146.     81.   **
** 3/27/79     645  16.6     7.9    10.3     107.    147.     81.   **
** 3/27/79     700  16.6     7.9    10.3     108.    149.     82.   **
** 3/27/79     715  16.6     7.9    10.3     109.    150.     83.   **
** 3/27/79     730  16.6     7.9    10.3     109.    150.     83.   **
** 3/27/79     745  16.6     7.9    10.3     112.    154.     85.   **
** 3/27/79     800  16.6     7.8    10.3     113.    155.     85.   **
** 3/27/79     815  16.6     7.9    10.3     112.    154.     85.   **
** 3/27/79     830  16.6     7.8    10.3     114.    157.     86.   **
** 3/27/79     845  16.6     7.8    10.3     117.    160.     88.   **
** 3/27/79     900  16.6     7.9    10.3     120.    165.     91.   **
** 3/27/79     915  16.6     7.8    10.3     123.    168.     93.   **
** 3/27/79     930  16.6     7.8    10.3     124.    170.     94.   **
** 3/27/79     945  16.6     7.9    10.3     125.    172.     95.   **
** 3/27/79    1000  16.6     7.9    10.3     124.    170.     94.   **
** 3/27/79    1015  16.6     7.9    10.3     124.    171.     94.   **
** 3/27/79    1030  16.6     7.9    10.3     122.    168.     93.   **
** 3/27/79    1045  16.6     7.9    10.3     119.    164.     90.   **
** 3/27/79    1100  16.6     7.9    10.3     118.    163.     90.   **
** 3/27/79    1115  16.6     7.9    10.3     118.    163.     90.   **
** 3/27/79    1130  16.6     7.9    10.3     117.    161.     89.   **
** 3/27/79    1145  16.6     7.9    10.3     119.    164.     91.   **
** 3/27/79    1200  16.6     7.9    10.3     119.    165.     91.   **
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************************************************************************
**                         15 MIN. DATA                               **
**                  DRY STACK GAS CONCENTRATION                       **
**                                                                    **
**                             O2      CO2     NO      NO      NO     **
**                    LOAD    VOL%    VOL%    PPMV    PPMV    NG/J    **
**   DATE     TIME    MWTH    MEAS    MEAS    MEAS    3%O2            **
************************************************************************
** 3/27/79    1215    16.6     7.9    10.3    118.    163.     90.    **
** 3/27/79    1230    16.6     7.9    10.3    119.    163.     90.    **
** 3/27/79    1245    16.6     7.9    10.3    119.    164.     90.    **
** 3/27/79    1300    16.6     7.8    10.4    118.    162.     89.    **
** 3/27/79    1315    16.4     7.7    10.4    116.    158.     87.    **
** 3/27/79    1330    16.4     7.7    10.4    116.    158.     87.    **
** 3/27/79    1345    16.4     7.8    10.4    117.    160.     88.    **
** 3/27/79    1400    16.4     7.9    10.4    114.    158.     87.    **
** 3/27/79    1415    16.4     8.1    10.4    104.    146.     80.    **
** 3/27/79    1430    16.4     8.2    10.3     97.    136.     75.    **
** 3/27/79    1445    16.4     8.2    10.3     96.    135.     75.    **
** 3/27/79    1500    16.4     8.1    10.3     97.    136.     75.    **
** 3/27/79    1515    16.6     8.1    10.4     98.    137.     76.    **
** 3/27/79    1530    16.6     7.9    10.4    102.    141.     78.    **
** 3/27/79    1545    16.6     7.7    10.4    107.    145.     80.    **
** 3/27/79    1600    16.6     7.6    10.4    110.    148.     82.    **
** 3/27/79    1615    16.7     7.6    10.5    111.    149.     82.    **
** 3/27/79    1630    16.7     7.6    10.5    111.    150.     82.    **
** 3/27/79    1645    16.7     7.6    10.5    111.    150.     83.    **
** 3/27/79    1700    16.7     7.7    10.5    110.    150.     82.    **
** 3/27/79    1715    16.7     7.7    10.5    110.    150.     82.    **
** 3/27/79    1730    16.7     7.7    10.5    109.    148.     82.    **
** 3/27/79    1745    16.7     7.7    10.5    106.    144.     79.    **
** 3/27/79    1800    16.7     7.6    10.5    109.    147.     81.    **
** 3/27/79    1815    16.7     7.7    10.5    109.    148.     82.    **
** 3/27/79    1830    16.7     7.7    10.5    109.    148.     82.    **
** 3/27/79    1845    16.7     8.0    10.5    109.    151.     83.    **
** 3/27/79    1900    16.7     8.0    10.5    108.    150.     82.    **
** 3/27/79    1915    16.7     7.9    10.5    107.    148.     81.    **
** 3/27/79    1930    16.7     8.1    10.2    108.    151.     83.    **
** 3/27/79    1945    16.7     7.9    10.4    108.    149.     82.    **
** 3/27/79    2000    16.7     7.9    10.4    109.    150.     83.    **
** 3/27/79    2015    16.7     7.9    10.4    109.    150.     83.    **
** 3/27/79    2030    16.7     7.9    10.4    109.    150.     83.    **
** 3/27/79    2045    16.7     7.9    10.4    108.    149.     82.    **
** 3/27/79    2100    16.7     7.9    10.4    107.    148.     81.    **
** 3/27/79    2115    16.7     7.9    10.4    107.    148.     82.    **
** 3/27/79    2130    16.7     7.9    10.4    107.    148.     81.    **
** 3/27/79    2145    16.7     7.9    10.4    106.    146.     81.    **
** 3/27/79    2200    16.7     7.9    10.4    105.    144.     80.    **
** 3/27/79    2215    16.6     7.9    10.4    105.    145.     80.    **
** 3/27/79    2230    16.6     7.9    10.4    106.    146.     81.    **
** 3/27/79    2245    16.6     7.9    10.4    108.    149.     82.    **
** 3/27/79    2300    16.6     7.9    10.4    108.    149.     82.    **
** 3/27/79    2315    16.6     7.9    10.4    107.    148.     81.    **
** 3/27/79    2330    16.6     7.9    10.5    106.    147.     81.    **
** 3/27/79    2345    16.6     7.9    10.5    106.    147.     81.    **
** 3/27/79    2400    16.6     7.9    10.4    106.    147.     81.    **
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*************************************************************
**                     15 MIN. DATA                        **
**              DRY STACK GAS CONCENTRATION                **
**                                                         **
**                        O2     CO2     NO     NO     NO  **
**                 LOAD  VOL%   VOL%   PPMV   PPMV   NG/J  **
**   DATE    TIME  MWTH  MEAS   MEAS   MEAS   3%O2         **
*************************************************************
** 3/28/79     15  16.6   7.9   10.4   106.   146.   81.   **
** 3/28/79     30  16.6   7.9   10.5   105.   145.   80.   **
** 3/28/79     45  16.6   7.9   10.5   105.   145.   80.   **
** 3/28/79    100  16.6   7.9   10.5   106.   147.   81.   **
** 3/28/79    115  16.6   7.9   10.5   106.   147.   81.   **
** 3/28/79    130  16.6   7.9   10.5   104.   144.   79.   **
** 3/28/79    145  16.6   7.9   10.5   104.   144.   79.   **
** 3/28/79    200  16.6   7.9   10.5   104.   143.   79.   **
** 3/28/79    215  16.7   7.9   10.5   104.   143.   79.   **
** 3/28/79    230  16.7   7.9   10.5   104.   144.   79.   **
** 3/28/79    245  16.7   7.9   10.5   103.   143.   79.   **
** 3/28/79    300  16.7   7.9   10.5   102.   141.   78.   **
** 3/28/79    315  16.7   7.9   10.5   101.   140.   77.   **
** 3/28/79    330  16.7   7.9   10.5   101.   139.   77.   **
** 3/28/79    345  16.7   7.9   10.6   100.   139.   76.   **
** 3/28/79    400  16.7   7.9   10.6    99.   138.   76.   **
** 3/28/79    415  16.6   8.6   10.2   107.   156.   86.   **
** 3/28/79    430  16.6   8.1   10.5   102.   143.   79.   **
** 3/28/79    445  16.6   8.1   10.5   100.   140.   77.   **
** 3/28/79    500  16.6   8.1   10.5   101.   141.   78.   **
** 3/28/79    515  16.6   8.1   10.5   101.   141.   78.   **
** 3/28/79    530  16.6   8.1   10.5   101.   141.   78.   **
** 3/28/79    545  16.6   8.1   10.5   101.   141.   78.   **
** 3/28/79    600  16.6   8.1   10.5   100.   140.   77.   **
** 3/28/79    615  16.6   8.1   10.5   100.   140.   77.   **
** 3/28/79    630  16.6   8.1   10.5    99.   139.   77.   **
** 3/28/79    645  16.6   8.1   10.5   100.   141.   77.   **
** 3/28/79    700  16.6   8.1   10.5   101.   141.   78.   **
** 3/28/79    715  16.4   8.1   10.5   102.   142.   78.   **
** 3/28/79    730  16.4   8.1   10.5   103.   143.   79.   **
** 3/28/79    745  16.4   8.0   10.5   103.   144.   79.   **
** 3/28/79    800  16.4   8.0   10.5   104.   145.   80.   **
** 3/28/79    815  16.4   8.1   10.5   104.   145.   80.   **
** 3/28/79    830  16.4   8.1   10.5   104.   146.   80.   **
** 3/28/79    845  16.4   8.1   10.5   104.   146.   81.   **
** 3/28/79    900  16.4   8.1   10.5   105.   146.   81.   **
** 3/28/79    915  16.4   8.1   10.5   106.   148.   82.   **
** 3/28/79    930  16.4   7.9   10.4   130.   178.   98.   **
** 3/28/79    945  16.4   7.9   10.4   130.   179.   99.   **
** 3/28/79   1000  16.4   7.9   10.4   130.   180.   99.   **
** 3/28/79   1015  16.4   7.9   10.4   130.   180.   99.   **
** 3/28/79   1030  16.4   7.9   10.4   131.   181.  100.   **
** 3/28/79   1045  16.4   7.9   10.4   131.   181.  100.   **
** 3/28/79   1100  16.4   7.9   10.4   132.   183.  101.   **
** 3/28/79   1115  16.4   7.9   10.4   132.   183.  101.   **
** 3/28/79   1130  16.4   7.9   10.4   131.   181.  100.   **
** 3/28/79   1145  16.4   7.9   10.4   131.   180.   99.   **
** 3/28/79   1200  16.4   7.9   10.4   131.   181.  100.   **
*************************************************************
```

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*******************************************************************
**                        15 MIN, DATA                           **
**                 DRY STACK GAS CONCENTRATION                   **
**                                                               **
**                           O2     CO2     NO     NO     NO     **
**                   LOAD   VOL%   VOL%    PPMV   PPMV   NG/J    **
**   DATE    TIME    MWTH   MEAS   MEAS    MEAS   3%O2           **
*******************************************************************
** 3/28/79   1215   16.6    7.9   10.4    132.   181.   100.     **
** 3/28/79   1230   16.6    7.9   10.4    131.   179.    99.     **
** 3/28/79   1245   16.6    7.9   10.4    130.   178.    98.     **
** 3/28/79   1300   16.6    7.7   10.4    131.   179.    99.     **
** 3/28/79   1315   16.6    7.7   10.4    132.   179.    99.     **
** 3/28/79   1330   16.6    7.7   10.5    133.   180.    99.     **
** 3/28/79   1345   16.6    7.7   10.4    133.   181.   100.     **
** 3/28/79   1400   16.6    7.7   10.4    134.   181.   100.     **
** 3/28/79   1415   16.6    7.7   10.4    132.   180.    99.     **
** 3/28/79   1430   16.6    7.7   10.4    132.   180.    99.     **
** 3/28/79   1445   16.6    7.7   10.4    132.   179.    99.     **
** 3/28/79   1500   16.6    7.7   10.4    182.   247.   136.     **
** 3/28/79   1515   16.6    7.7   10.4    177.   240.   132.     **
** 3/28/79   1530   16.6    7.7   10.4    178.   242.   133.     **
** 3/28/79   1545   16.6    7.7   10.4    176.   239.   132.     **
** 3/28/79   1600   16.6    7.7   10.4    177.   240.   132.     **
** 3/28/79   1615   16.6    7.5   10.2     -1.    -1.    -1.     **
** 3/28/79   1630   16.6    7.4   10.5     -1.    -1.    -1.     **
** 3/28/79   1645   16.6    7.6   10.3     -1.    -1.    -1.     **
** 3/28/79   1700   16.6    7.6   10.3     -1.    -1.    -1.     **
** 3/28/79   1715   16.6    7.7   10.3     -1.    -1.    -1.     **
** 3/28/79   1730   16.6    7.7   10.3     -1.    -1.    -1.     **
** 3/28/79   1745   16.6    7.7   10.3     -1.    -1.    -1.     **
** 3/28/79   1800   16.6    7.8   10.3     -1.    -1.    -1.     **
** 3/28/79   1815   16.6    7.8   10.3     -1.    -1.    -1.     **
** 3/28/79   1830   16.6    7.8   10.3     -1.    -1.    -1.     **
** 3/28/79   1845   16.6    7.8   10.3     -1.    -1.    -1.     **
** 3/28/79   1900   16.6    7.8   10.3     -1.    -1.    -1.     **
** 3/28/79   1915   16.6    7.8   10.3     -1.    -1.    -1.     **
** 3/28/79   1930   16.6    8.1   10.1     -1.    -1.    -1.     **
** 3/28/79   1945   16.6    7.9   10.1     -1.    -1.    -1.     **
** 3/28/79   2000   16.6    7.9   10.1     -1.    -1.    -1.     **
** 3/28/79   2015   16.7    7.9   10.1     -1.    -1.    -1.     **
** 3/28/79   2030   16.7    7.9   10.1     -1.    -1.    -1.     **
** 3/28/79   2045   16.7    7.9   10.1     -1.    -1.    -1.     **
** 3/28/79   2100   16.7    7.9   10.2     -1.    -1.    -1.     **
** 3/28/79   2115   16.7    7.9   10.2     -1.    -1.    -1.     **
** 3/28/79   2130   16.7    7.9   10.2     -1.    -1.    -1.     **
** 3/28/79   2145   16.7    7.9   10.2     -1.    -1.    -1.     **
** 3/28/79   2200   16.7    7.9   10.2     -1.    -1.    -1.     **
** 3/28/79   2215   16.6    8.0   10.1     -1.    -1.    -1.     **
** 3/28/79   2230   16.6    8.2   10.1     -1.    -1.    -1.     **
** 3/28/79   2245   16.6    8.2   10.1     -1.    -1.    -1.     **
** 3/28/79   2300   16.6    8.2   10.1     -1.    -1.    -1.     **
** 3/28/79   2315   16.7    8.2   10.1     -1.    -1.    -1.     **
** 3/28/79   2330   16.7    8.2   10.1     -1.    -1.    -1.     **
** 3/28/79   2345   16.7    8.1   10.1     -1.    -1.    -1.     **
** 3/28/79   2400   16.7    8.1   10.1     -1.    -1.    -1.     **
*******************************************************************
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**************************************************************
**                       15 MIN. DATA                       **
**               DRY STACK GAS CONCENTRATION                **
**                                                          **
**                        O2     CO2     NO     NO     NO   **
**                LOAD   VOL%   VOL%    PPMV   PPMV   NG/J  **
**  DATE    TIME  MWTH   MEAS   MEAS    MEAS   3%O2         **
**************************************************************
** 3/29/79    15   9.8    8.1   10.1    -1.    -1.    -1.   **
** 3/29/79    30   9.8    8.1   10.1    -1.    -1.    -1.   **
** 3/29/79    45   9.8    8.1   10.1    -1.    -1.    -1.   **
** 3/29/79   100   9.8    8.1   10.1    -1.    -1.    -1.   **
** 3/29/79   115   9.7   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   130   9.7   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   145   9.7   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   200   9.7   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   215  11.1   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   230  11.1   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   245  11.1   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   300  11.1   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   315  12.0   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   330  12.0    8.1   10.0    -1.    -1.    -1.   **
** 3/29/79   345  12.0   -1.0   10.0    -1.    -1.    -1.   **
** 3/29/79   400  12.0   -1.0   10.0    -1.    -1.    -1.   **
** 3/29/79   415  12.6   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   430  12.6   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   445  12.6   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   500  12.6   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   515  16.4   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   530  16.4   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   545  16.4   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   600  16.4   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   615  16.4   -1.0   10.0    -1.    -1.    -1.   **
** 3/29/79   630  16.4    8.1   10.1    -1.    -1.    -1.   **
** 3/29/79   645  16.4    8.1   10.1    -1.    -1.    -1.   **
** 3/29/79   700  16.4   -1.0   10.1    -1.    -1.    -1.   **
** 3/29/79   715  16.4   -1.0   10.0    -1.    -1.    -1.   **
** 3/29/79   730  16.4    8.1   10.0    -1.    -1.    -1.   **
** 3/29/79   745  16.4    8.1   10.0    -1.    -1.    -1.   **
** 3/29/79   800  16.4    9.5   10.0    -1.    -1.    -1.   **
** 3/29/79   815  15.8   10.7    7.7    -1.    -1.    -1.   **
** 3/29/79   830  15.8   10.4    8.0    -1.    -1.    -1.   **
** 3/29/79   845  15.8   11.0    7.7    -1.    -1.    -1.   **
** 3/29/79   900  15.8   11.0    7.5    -1.    -1.    -1.   **
** 3/29/79   915  10.5   10.7    7.5    -1.    -1.    -1.   **
** 3/29/79   930  10.5   10.6    7.5    -1.    -1.    -1.   **
** 3/29/79   945  10.5   10.7    7.5    -1.    -1.    -1.   **
** 3/29/79  1000  10.5   10.7    7.4    -1.    -1.    -1.   **
** 3/29/79  1015   9.7   10.6    7.4    -1.    -1.    -1.   **
** 3/29/79  1030   9.7   10.5    7.4    -1.    -1.    -1.   **
** 3/29/79  1045   9.7   10.4    7.4    -1.    -1.    -1.   **
** 3/29/79  1100   9.7   10.3    7.4    -1.    -1.    -1.   **
** 3/29/79  1115   9.7   10.2    7.4    -1.    -1.    -1.   **
** 3/29/79  1130   9.7   10.4    7.4    -1.    -1.    -1.   **
** 3/29/79  1145   9.7   10.7     .0    -1.    -1.    -1.   **
** 3/29/79  1200   9.7   -1.0    7.4    -1.    -1.    -1.   **
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*******************************************************************
**                          15 MIN. DATA                         **
**                  DRY STACK GAS CONCENTRATION                  **
**                                                               **
**                            O2      CO2     NO      NO      NO **
**                    LOAD    VOL%    VOL%    PPMV    PPMV    NG/J **
**                    MWTH    MEAS    MEAS    MEAS    3%O2       **
**   DATE      TIME                                              **
*******************************************************************
** 3/29/79     1215    9.7    10.6     7.5    -1.     -1.     -1.  **
** 3/29/79     1230    9.7    10.6     7.5    -1.     -1.     -1.  **
** 3/29/79     1245    9.7    10.6     7.5    -1.     -1.     -1.  **
** 3/29/79     1300    9.7    10.6      .0    -1.     -1.     -1.  **
** 3/29/79     1315    9.8    10.6      .0    -1.     -1.     -1.  **
** 3/29/79     1330    9.8    10.6      .0    -1.     -1.     -1.  **
** 3/29/79     1345    9.8    10.6      .0    -1.     -1.     -1.  **
** 3/29/79     1400    9.8    10.7     7.5    -1.     -1.     -1.  **
** 3/29/79     1415    9.8    10.7     7.4    -1.     -1.     -1.  **
** 3/29/79     1430    9.8    10.7     7.4    -1.     -1.     -1.  **
** 3/29/79     1445    9.8    10.6     7.5    -1.     -1.     -1.  **
** 3/29/79     1500    9.8    10.5     7.5    -1.     -1.     -1.  **
** 3/29/79     1515    9.8    10.5     7.5    -1.     -1.     -1.  **
** 3/29/79     1530    9.8    10.6     7.5    -1.     -1.     -1.  **
** 3/29/79     1545    9.8    10.5      .0    -1.     -1.     -1.  **
** 3/29/79     1600    9.8    10.5      .0    -1.     -1.     -1.  **
** 3/29/79     1615    9.8    10.5      .0    -1.     -1.     -1.  **
** 3/29/79     1630    9.8    10.5      .0    -1.     -1.     -1.  **
** 3/29/79     1645    9.8    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1700    9.8    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1715   10.0    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1730   10.0    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1745   10.0    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1800   10.0    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1815   10.0    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1830   10.0    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1845   10.0    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1900   10.0    10.5     7.6    -1.     -1.     -1.  **
** 3/29/79     1915   10.0    10.7     7.6    -1.     -1.     -1.  **
** 3/29/79     1930   10.0    11.1     7.1    -1.     -1.     -1.  **
** 3/29/79     1945   10.0    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2000   10.0    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2015   10.0    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2030   10.0    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2045   10.0    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2100   10.0    11.3     7.0    -1.     -1.     -1.  **
** 3/29/79     2115   10.0    11.3     7.0    -1.     -1.     -1.  **
** 3/29/79     2130   10.0    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2145   10.0    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2200   10.0    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2215    9.8    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2230    9.8    11.4     7.0    -1.     -1.     -1.  **
** 3/29/79     2245    9.8    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2300    9.8    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2315    9.7    11.2     7.0    -1.     -1.     -1.  **
** 3/29/79     2330    9.7    11.3     7.0    -1.     -1.     -1.  **
** 3/29/79     2345    9.7    11.4     7.0    -1.     -1.     -1.  **
** 3/29/79     2400    9.7    11.4     7.0    -1.     -1.     -1.  **
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*********************************************************************
**                          15 MIN. DATA                           **
**                  DRY STACK GAS CONCENTRATION                    **
**                                                                 **
**                           O2      CO2     NO      NO      NO    **
**                   LOAD    VOL%    VOL%    PPMV    PPMV    NG/J  **
**   DATE    TIME    MWTH    MEAS    MEAS    MEAS    3%O2          **
*********************************************************************
** 3/30/79     15    13.8    11.3     7.0    -1.     -1.     -1.   **
** 3/30/79     30    13.8    11.3      .0    -1.     -1.     -1.   **
** 3/30/79     45    13.8    11.3      .0    -1.     -1.     -1.   **
** 3/30/79    100    13.8    11.3      .0    -1.     -1.     -1.   **
** 3/30/79    115    13.9    10.2      .0    -1.     -1.     -1.   **
** 3/30/79    130    13.9    10.2     7.0    -1.     -1.     -1.   **
** 3/30/79    145    13.9    10.3     8.0    -1.     -1.     -1.   **
** 3/30/79    200    13.9    10.3     8.0    -1.     -1.     -1.   **
** 3/30/79    215    13.9    10.0     8.0    -1.     -1.     -1.   **
** 3/30/79    230    13.9     9.6     8.0    -1.     -1.     -1.   **
** 3/30/79    245    13.9     9.6     8.1    -1.     -1.     -1.   **
** 3/30/79    300    13.9     9.5     8.6    -1.     -1.     -1.   **
** 3/30/79    315    13.9     9.5     8.6    -1.     -1.     -1.   **
** 3/30/79    330    13.9    10.9     8.6    -1.     -1.     -1.   **
** 3/30/79    345    13.9    10.9     8.6    -1.     -1.     -1.   **
** 3/30/79    400    13.9    10.9     7.4    -1.     -1.     -1.   **
** 3/30/79    415    14.2    10.6     7.4    -1.     -1.     -1.   **
** 3/30/79    430    14.2    10.5     7.4    -1.     -1.     -1.   **
** 3/30/79    445    14.2    10.5     7.5    -1.     -1.     -1.   **
** 3/30/79    500    14.2    10.5     7.7    -1.     -1.     -1.   **
** 3/30/79    515    12.7    10.5     7.7    -1.     -1.     -1.   **
** 3/30/79    530    12.7    10.5     7.7    -1.     -1.     -1.   **
** 3/30/79    545    12.7    10.5     7.7    -1.     -1.     -1.   **
** 3/30/79    600    12.7    10.5     7.7    -1.     -1.     -1.   **
** 3/30/79    615    12.7    10.5     7.8    -1.     -1.     -1.   **
** 3/30/79    630    12.7    10.5     7.8    -1.     -1.     -1.   **
** 3/30/79    645    12.7    10.5     7.8    -1.     -1.     -1.   **
** 3/30/79    700    12.7    10.5     7.8    -1.     -1.     -1.   **
** 3/30/79    715    12.7    10.5     7.8    -1.     -1.     -1.   **
** 3/30/79    730    12.7    10.7     7.8    -1.     -1.     -1.   **
** 3/30/79    745    12.7    10.7     7.8    -1.     -1.     -1.   **
** 3/30/79    800    12.7    10.7     7.8    -1.     -1.     -1.   **
** 3/30/79    815    12.6    10.7     7.8    -1.     -1.     -1.   **
** 3/30/79    830    12.6    10.5     7.8    -1.     -1.     -1.   **
** 3/30/79    845    12.6    10.4     7.8    -1.     -1.     -1.   **
** 3/30/79    900    12.6    10.4     7.8    -1.     -1.     -1.   **
** 3/30/79    915    12.6    10.5     7.8    -1.     -1.     -1.   **
** 3/30/79    930    12.6    10.5     7.8    -1.     -1.     -1.   **
** 3/30/79    945    12.6    10.6     7.8    -1.     -1.     -1.   **
** 3/30/79   1000    12.6    11.0     7.8    -1.     -1.     -1.   **
** 3/30/79   1015    12.6    11.0     7.8    -1.     -1.     -1.   **
** 3/30/79   1030    12.6    11.1     7.8    -1.     -1.     -1.   **
** 3/30/79   1045    12.6    11.0     7.8   132.    240.    132.   **
** 3/30/79   1100    12.6    11.0     7.8   128.    232.    128.   **
** 3/30/79   1115    12.5    11.2     7.8   128.    236.    130.   **
** 3/30/79   1130    12.5    11.2     7.8   127.    234.    129.   **
** 3/30/79   1145    12.5    11.1     7.8   128.    234.    129.   **
** 3/30/79   1200    12.5    11.1     7.8   132.    242.    133.   **
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**************************************************************************
**                            15 MIN. DATA                              **
**                    DRY STACK GAS CONCENTRATION                       **
**                                                                      **
**                            O2       CO2      NO      NO      NO      **
**                   LOAD     VOL%     VOL%     PPMV    PPMV    NG/J    **
**   DATE     TIME   MWTH     MEAS     MEAS     MEAS    3%O2            **
**************************************************************************
** 3/30/79    1215   12.5     11.2      7.8     126.    232.    128.    **
** 3/30/79    1230   12.5     10.3      7.8     126.    214.    118.    **
** 3/30/79    1245   12.5     10.3      7.7     128.    217.    119.    **
** 3/30/79    1300   12.5     10.3      7.7     124.    211.    116.    **
** 3/30/79    1315   12.5     10.4      7.7     123.    209.    115.    **
** 3/30/79    1330   12.5     10.7      7.7     124.    218.    120.    **
** 3/30/79    1345   12.5     10.7      7.7     125.    220.    121.    **
** 3/30/79    1400   12.5     10.7      7.7     125.    220.    122.    **
** 3/30/79    1415   12.5     10.7      7.7     125.    219.    121.    **
** 3/30/79    1430   12.5     10.7      7.7     124.    218.    120.    **
** 3/30/79    1445   12.5     11.0      7.7     125.    226.    124.    **
** 3/30/79    1500   12.5     10.5      7.7     124.    214.    118.    **
** 3/30/79    1515   12.5     10.5      7.7     125.    215.    118.    **
** 3/30/79    1530   12.5     10.5      7.7     127.    217.    120.    **
** 3/30/79    1545   12.5     10.5      7.7     127.    218.    120.    **
** 3/30/79    1600   12.5     10.5      7.8     127.    218.    120.    **
** 3/30/79    1615   12.6     10.5      7.8     127.    221.    122.    **
** 3/30/79    1630   12.6     10.5      7.8     127.    221.    122.    **
** 3/30/79    1645   12.6     10.5      7.8     127.    221.    122.    **
** 3/30/79    1700   12.6     10.5      7.8     129.    224.    123.    **
** 3/30/79    1715   12.6     10.5      7.8     129.    223.    123.    **
** 3/30/79    1730   12.6     10.6      7.8     127.    221.    122.    **
** 3/30/79    1745   12.6     10.6      7.8     125.    217.    119.    **
** 3/30/79    1800   12.6     10.6      7.8     125.    217.    119.    **
** 3/30/79    1815   12.6     10.6      7.8     125.    217.    119.    **
** 3/30/79    1830   12.6     11.0      7.8     122.    221.    122.    **
** 3/30/79    1845   12.6     10.6      7.5     124.    215.    118.    **
** 3/30/79    1900   12.6     10.6      7.7     124.    215.    119.    **
** 3/30/79    1915   12.5     10.6      7.7     124.    215.    119.    **
** 3/30/79    1930   12.5     10.6      7.7     124.    216.    119.    **
** 3/30/79    1945   12.5     10.6      7.7     123.    214.    118.    **
** 3/30/79    2000   12.5     10.6      7.7     122.    212.    117.    **
** 3/30/79    2015   12.5     10.6      7.7     120.    209.    115.    **
** 3/30/79    2030   12.5     10.6      7.7     120.    209.    115.    **
** 3/30/79    2045   12.5     10.6      7.7     120.    209.    115.    **
** 3/30/79    2100   12.5     10.6      7.7     120.    209.    115.    **
** 3/30/79    2115   12.5     10.6      7.7     119.    208.    115.    **
** 3/30/79    2130   12.5     10.6      7.7     119.    208.    115.    **
** 3/30/79    2145   12.5     10.6      7.7     119.    208.    115.    **
** 3/30/79    2200   12.5     10.2      8.7     125.    210.    116.    **
** 3/30/79    2215   12.6      9.8      8.7     126.    203.    112.    **
** 3/30/79    2230   12.6      9.8      8.7     126.    203.    112.    **
** 3/30/79    2245   12.6      9.8      8.7      -1.     -1.     -1.    **
** 3/30/79    2300   12.6      9.8      8.7     124.    200.    110.    **
** 3/30/79    2315   13.8      9.8      8.7     124.    200.    110.    **
** 3/30/79    2330   13.8      9.8      8.7     124.    201.    111.    **
** 3/30/79    2345   13.8      9.8      8.7     125.    202.    111.    **
** 3/30/79    2400   13.8      9.8      8.8     126.    203.    112.    **
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**************************************************************
**                       15 MIN. DATA                       **
**               DRY STACK GAS CONCENTRATION                **
**                                                          **
**                          O2     CO2     NO     NO    NO  **
**                  LOAD   VOL%   VOL%   PPMV   PPMV   NG/J **
**   DATE    TIME   MWTH   MEAS   MEAS   MEAS   3%O2        **
**************************************************************
** 3/31/79     15   13.8    9.8    8.6   126.   203.   112. **
** 3/31/79     30   13.8    9.8    8.6   126.   204.   112. **
** 3/31/79     45   13.8    9.8    8.6   126.   204.   112. **
** 3/31/79    100   13.8    9.8    8.6   126.   204.   112. **
** 3/31/79    115   13.8    9.8    8.6   126.   203.   112. **
** 3/31/79    130   13.8    9.8    8.6   126.   204.   112. **
** 3/31/79    145   13.8    9.8    8.6   126.   204.   112. **
** 3/31/79    200   13.8    9.8    8.6   126.   204.   112. **
** 3/31/79    215   13.8    9.8    8.6   126.   204.   112. **
** 3/31/79    230   13.8    9.8    8.5   126.   204.   112. **
** 3/31/79    245   13.8    9.8    8.5   126.   203.   112. **
** 3/31/79    300   13.8    9.8    8.5   125.   202.   111. **
** 3/31/79    315   13.8   10.0    8.3   125.   206.   114. **
** 3/31/79    330   13.8   10.0    8.3   125.   206.   114. **
** 3/31/79    345   13.8   10.0    8.3    -1.    -1.    -1. **
** 3/31/79    400   13.8   10.1    8.3    -1.    -1.    -1. **
** 3/31/79    415   13.8   10.2    8.1   125.   210.   116. **
** 3/31/79    430   13.8   10.3    8.1   124.   210.   116. **
** 3/31/79    445   13.8   10.3     .0   124.   209.   115. **
** 3/31/79    500   13.8   10.3     .0   124.   209.   115. **
** 3/31/79    515   13.8   10.2     .0   123.   208.   114. **
** 3/31/79    530   13.8   10.2     .0   124.   209.   115. **
** 3/31/79    545   13.8   10.2     .0   124.   208.   115. **
** 3/31/79    600   13.8   10.2     .0   124.   208.   115. **
** 3/31/79    615   13.8   10.2     .0   124.   208.   115. **
** 3/31/79    630   13.8   10.2     .0   124.   208.   115. **
** 3/31/79    645   13.8   10.2     .0   124.   208.   115. **
** 3/31/79    700   13.8   10.2    8.1   124.   208.   115. **
** 3/31/79    715   13.9   10.2    8.2   124.   208.   115. **
** 3/31/79    730   13.9   10.2     .0   125.   210.   116. **
** 3/31/79    745   13.9   10.2     .0   126.   210.   116. **
** 3/31/79    800   13.9   10.1     .0   126.   209.   115. **
** 3/31/79    815   13.9   10.1     .0   129.   213.   118. **
** 3/31/79    830   13.9   10.1     .0   132.   218.   120. **
** 3/31/79    845   13.9   10.0     .0   132.   218.   120. **
** 3/31/79    900   13.9   10.0     .0   133.   218.   120. **
** 3/31/79    915   13.8   10.0     .0   134.   220.   122. **
** 3/31/79    930   13.8   10.0     .0   135.   222.   122. **
** 3/31/79    945   13.8   10.0     .0   132.   218.   120. **
** 3/31/79   1000   13.8   10.0     .0   132.   218.   120. **
** 3/31/79   1015   13.8   10.0     .0   135.   223.   123. **
** 3/31/79   1030   13.8   10.0     .0   137.   225.   124. **
** 3/31/79   1045   13.8   10.0     .0   140.   230.   127. **
** 3/31/79   1100   13.8   10.0     .0   141.   232.   128. **
** 3/31/79   1115   13.8   10.0     .0   142.   233.   128. **
** 3/31/79   1130   13.8   10.0     .0   143.   234.   129. **
** 3/31/79   1145   13.8   10.0     .0   143.   234.   129. **
** 3/31/79   1200   13.8   10.0    8.2   143.   234.   129. **
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**                          15 MIN. DATA                         **
**                   DRY STACK GAS CONCENTRATION                 **
**                                                               **
**                            O2      CO2     NO      NO     NO  **
**                    LOAD    VOL%    VOL%    PPMV    PPMV   NG/J**
**   DATE     TIME    MWTH    MEAS    MEAS    MEAS    3%O2       **
*******************************************************************
** 3/31/79    1215    13.9    10.0     8.2    143.    234.   129. **
** 3/31/79    1230    13.9    10.0     8.2    143.    236.   130. **
** 3/31/79    1245    13.9    10.0     8.2    143.    236.   130. **
** 3/31/79    1300    13.9    10.0     8.2    143.    236.   130. **
** 3/31/79    1315    13.9    10.0     8.2    144.    238.   131. **
** 3/31/79    1330    13.9    10.0     8.2    145.    239.   132. **
** 3/31/79    1345    13.9    10.0     8.2    146.    241.   133. **
** 3/31/79    1400    13.9    10.0     8.2    146.    241.   133. **
** 3/31/79    1415    14.1    10.0     8.2    146.    241.   133. **
** 3/31/79    1430    14.1    10.0     8.2    146.    241.   133. **
** 3/31/79    1445    14.1    10.0     8.2    145.    239.   132. **
** 3/31/79    1500    14.1    10.0     8.3    144.    238.   131. **
** 3/31/79    1515    14.1    10.0     8.3    143.    236.   130. **
** 3/31/79    1530    14.1    10.0     8.3    142.    235.   130. **
** 3/31/79    1545    14.1    10.0     8.3    141.    233.   128. **
** 3/31/79    1600    14.1    10.0     8.3    139.    230.   127. **
** 3/31/79    1615    14.1    10.1     8.3    139.    230.   127. **
** 3/31/79    1630    14.1    10.1     8.3    140.    232.   128. **
** 3/31/79    1645    14.1    10.1     8.2    140.    233.   128. **
** 3/31/79    1700    14.1    10.1     8.2    140.    233.   129. **
** 3/31/79    1715    14.1    10.1     8.2    140.    233.   129. **
** 3/31/79    1730    14.1    10.1     8.2    141.    235.   129. **
** 3/31/79    1745    14.1    10.2     8.2    140.    234.   129. **
** 3/31/79    1800    14.1    10.2     8.2    139.    233.   128. **
** 3/31/79    1815    14.1    10.2     8.2    138.    231.   127. **
** 3/31/79    1830    14.1    10.2     8.2    137.    229.   126. **
** 3/31/79    1845    14.1    10.5     8.1    134.    231.   128. **
** 3/31/79    1900    14.1    10.1     8.3    133.    221.   122. **
** 3/31/79    1915    13.8    10.1     8.3    131.    218.   120. **
** 3/31/79    1930    13.8    10.1     8.3    131.    217.   120. **
** 3/31/79    1945    13.8    10.1     8.3    130.    216.   119. **
** 3/31/79    2000    13.8    10.1     8.3    130.    216.   119. **
** 3/31/79    2015    14.1    10.1     8.3    130.    217.   120. **
** 3/31/79    2030    14.1    10.1     8.3    130.    216.   119. **
** 3/31/79    2045    14.1    10.1     8.3    129.    215.   119. **
** 3/31/79    2100    14.1    10.1     8.3    129.    215.   118. **
** 3/31/79    2115    14.1    10.1     8.3    129.    215.   118. **
** 3/31/79    2130    14.1    10.1     8.3    129.    215.   119. **
** 3/31/79    2145    14.1    10.1     8.3    129.    216.   119. **
** 3/31/79    2200    14.1    10.1     8.3    129.    215.   119. **
** 3/31/79    2215    14.1    10.1     8.3    129.    215.   119. **
** 3/31/79    2230    14.1    10.2     8.3    128.    214.   118. **
** 3/31/79    2245    14.1    10.2     8.3    128.    215.   119. **
** 3/31/79    2300    14.1    10.2     8.3    128.    214.   118. **
** 3/31/79    2315    13.9    10.2     8.3    124.    208.   115. **
** 3/31/79    2330    13.9    10.2     8.3    123.    206.   114. **
** 3/31/79    2345    13.9    10.2     8.3    124.    207.   114. **
** 3/31/79    2400    13.9    10.2     8.3    124.    208.   115. **
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**                            15 MIN. DATA                              **
**                    DRY STACK GAS CONCENTRATION                       **
**                                                                      **
**                            O2       CO2      NO       NO       NO    **
**                    LOAD    VOL%     VOL%     PPMV     PPMV     NG/J  **
**   DATE      TIME   MWTH    MEAS     MEAS     MEAS     3%O2           **
**************************************************************************
** 4/ 1/79       15   13.3    10.2      8.3     124.     207.     114.  **
** 4/ 1/79       30   13.3    10.2      8.3     124.     208.     115.  **
** 4/ 1/79       45   13.3    10.2      8.3     125.     208.     115.  **
** 4/ 1/79      100   13.3    10.2      8.3     124.     208.     115.  **
** 4/ 1/79      115   13.3    10.2      8.3     124.     208.     115.  **
** 4/ 1/79      130   13.3    10.2      8.3     124.     208.     115.  **
** 4/ 1/79      145   13.3    10.2      8.3     124.     207.     114.  **
** 4/ 1/79      200   13.3    10.2      8.3     124.     207.     114.  **
** 4/ 1/79      215   13.3    10.2      8.3     125.     209.     115.  **
** 4/ 1/79      230   13.3    10.2      8.3     124.     208.     115.  **
** 4/ 1/79      245   13.3    10.2      8.3     124.     208.     115.  **
** 4/ 1/79      300   13.3    10.2      8.3     124.     208.     115.  **
** 4/ 1/79      315   13.3    10.2      8.2     124.     207.     114.  **
** 4/ 1/79      330   13.3    10.2      8.2     122.     204.     113.  **
** 4/ 1/79      345   13.3    10.2      8.2     121.     202.     112.  **
** 4/ 1/79      400   13.3    10.2      8.2     119.     200.     110.  **
** 4/ 1/79      415   13.3    10.5      8.2     119.     206.     113.  **
** 4/ 1/79      430   13.3    10.4      7.9     119.     202.     112.  **
** 4/ 1/79      445   13.3    10.3      8.1     119.     202.     111.  **
** 4/ 1/79      500   13.3    10.3      8.1     120.     203.     112.  **
** 4/ 1/79      515   13.5    10.2      8.1     120.     202.     111.  **
** 4/ 1/79      530   13.5    10.2      8.1     121.     203.     112.  **
** 4/ 1/79      545   13.5    10.2      8.1     122.     204.     113.  **
** 4/ 1/79      600   13.5    10.2      8.1     124.     207.     114.  **
** 4/ 1/79      615   13.6    10.2      8.1     124.     207.     114.  **
** 4/ 1/79      630   13.6    10.2      8.1     124.     208.     115.  **
** 4/ 1/79      645   13.6    10.2      8.1     124.     208.     115.  **
** 4/ 1/79      700   13.6    10.2      8.1     124.     208.     115.  **
** 4/ 1/79      715   13.6    10.2      8.1     124.     208.     115.  **
** 4/ 1/79      730   13.6    10.2      8.1     124.     208.     115.  **
** 4/ 1/79      745   13.6    10.2      8.1     125.     209.     115.  **
** 4/ 1/79      800   13.6    10.2      8.1     125.     209.     115.  **
** 4/ 1/79      815   13.6    10.2      8.1     125.     209.     115.  **
** 4/ 1/79      830   13.6    10.2      8.1     125.     209.     115.  **
** 4/ 1/79      845   13.6    10.2      8.1     125.     210.     116.  **
** 4/ 1/79      900   13.6    10.2      8.1     125.     210.     116.  **
** 4/ 1/79      915   13.6    10.2      8.1     126.     211.     116.  **
** 4/ 1/79      930   13.6    10.2      8.1     126.     211.     116.  **
** 4/ 1/79      945   13.6    10.2      8.1     126.     211.     116.  **
** 4/ 1/79     1000   13.6    10.2      8.1     126.     211.     116.  **
** 4/ 1/79     1015   13.6    10.2      8.1     126.     211.     116.  **
** 4/ 1/79     1030   13.6    10.2      8.1     126.     212.     117.  **
** 4/ 1/79     1045   13.6    10.2      8.1     129.     216.     119.  **
** 4/ 1/79     1100   13.6    10.2      8.1     129.     216.     119.  **
** 4/ 1/79     1115   13.6    10.2      8.1     128.     215.     119.  **
** 4/ 1/79     1130   13.6    10.2      8.1     128.     215.     118.  **
** 4/ 1/79     1145   13.6    10.2      8.1     128.     215.     118.  **
** 4/ 1/79     1200   13.6    10.2      8.1     128.     215.     118.  **
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*********************************************************************
**                         15 MIN. DATA                            **
**                 DRY STACK GAS CONCENTRATION                     **
**                                                                 **
**                             O2      CO2     NO      NO     NO   **
**                     LOAD    VOL%    VOL%    PPMV    PPMV   NG/J **
**   DATE      TIME    MWTH    MEAS    MEAS    MEAS    3%O2        **
*********************************************************************
** 4/ 1/79     1215    13.6    10.2    8.1     128.    215.   118. **
** 4/ 1/79     1230    13.6    11.6    6.8     110.    212.   117. **
** 4/ 1/79     1245    13.6    11.6    6.8     111.    214.   118. **
** 4/ 1/79     1300    13.6    11.6    6.8     112.    215.   119. **
** 4/ 1/79     1315    13.6    11.5    6.9     112.    214.   118. **
** 4/ 1/79     1330    13.6    11.5    7.0     113.    214.   118. **
** 4/ 1/79     1345    13.6    11.3    7.1     114.    213.   118. **
** 4/ 1/79     1400    13.6    11.2    7.2     116.    215.   119. **
** 4/ 1/79     1415    13.8    11.2    7.3     117.    216.   119. **
** 4/ 1/79     1430    13.8    10.9    7.4     121.    218.   120. **
** 4/ 1/79     1445    13.8    10.8    7.5     124.    221.   122. **
** 4/ 1/79     1500    13.8    10.7    7.6     126.    222.   122. **
** 4/ 1/79     1515    13.8    10.7    7.7     127.    224.   124. **
** 4/ 1/79     1530    13.8    10.7    7.7     127.    224.   124. **
** 4/ 1/79     1545    13.8    10.9    7.7     122.    217.   120. **
** 4/ 1/79     1600    13.8    10.9    7.6     121.    217.   119. **
** 4/ 1/79     1615    13.8    11.0    7.5     119.    215.   118. **
** 4/ 1/79     1630    13.8    11.0    7.5     119.    214.   118. **
** 4/ 1/79     1645    13.8    11.0    7.5     119.    214.   118. **
** 4/ 1/79     1700    13.8    10.9    7.5     119.    214.   118. **
** 4/ 1/79     1715    13.8    10.9    7.6     121.    217.   119. **
** 4/ 1/79     1730    13.8    10.9    7.7     121.    216.   119. **
** 4/ 1/79     1745    13.8    10.9    7.7     122.    217.   120. **
** 4/ 1/79     1800    13.8    11.0    7.7     121.    218.   120. **
** 4/ 1/79     1815    13.6    11.0    7.6     120.    218.   120. **
** 4/ 1/79     1830    13.6    11.2    7.5     118.    217.   120. **
** 4/ 1/79     1845    13.6    11.2    7.5     116.    215.   119. **
** 4/ 1/79     1900    13.6    11.2    7.4     116.    215.   119. **
** 4/ 1/79     1915    13.6    11.7    7.1     112.    220.   121. **
** 4/ 1/79     1930    13.6    11.7    6.9     114.    223.   123. **
** 4/ 1/79     1945    13.6    11.8    6.9     113.    223.   123. **
** 4/ 1/79     2000    13.6    11.8    6.9     113.    222.   123. **
** 4/ 1/79     2015    13.6    11.9    6.9     112.    223.   123. **
** 4/ 1/79     2030    13.6    11.9    6.9     113.    224.   124. **
** 4/ 1/79     2045    13.6    11.9    6.9     114.    225.   124. **
** 4/ 1/79     2100    13.6    11.9    6.9     113.    224.   124. **
** 4/ 1/79     2115    13.5    11.9    6.9     113.    226.   124. **
** 4/ 1/79     2130    13.5    11.9    6.9     111.    222.   122. **
** 4/ 1/79     2145    13.5    12.1    6.8     109.    221.   122. **
** 4/ 1/79     2200    13.5    12.2    6.7     108.    222.   123. **
** 4/ 1/79     2215    13.5    12.1    6.8     108.    222.   122. **
** 4/ 1/79     2230    13.5    11.9    6.9     112.    223.   123. **
** 4/ 1/79     2245    13.5    11.5    7.1     116.    223.   123. **
** 4/ 1/79     2300    13.5    11.3    7.2     120.    224.   124. **
** 4/ 1/79     2315    13.5    11.2    7.3     123.    229.   126. **
** 4/ 1/79     2330    13.5    11.2    7.4     124.    230.   127. **
** 4/ 1/79     2345    13.5    11.2    7.4     125.    230.   127. **
** 4/ 1/79     2400    13.5    11.0    7.5     126.    229.   126. **
*********************************************************************
```

15 MIN, DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NU PPMV MEAS	NO PPMV 3%O2	NO NG/J
4/ 2/79	15	16.0	11.0	7.5	127.	230.	127.
4/ 2/79	30	16.0	11.0	7.5	127.	229.	126.
4/ 2/79	45	16.0	11.0	7.5	127.	231.	127.
4/ 2/79	100	16.0	11.0	7.5	132.	241.	133.
4/ 2/79	115	16.0	11.1	7.5	134.	245.	135.
4/ 2/79	130	16.0	11.1	7.5	134.	244.	134.
4/ 2/79	145	16.0	11.1	7.5	133.	243.	134.
4/ 2/79	200	16.0	11.1	7.5	134.	244.	135.
4/ 2/79	215	16.0	11.1	7.5	134.	244.	135.
4/ 2/79	230	16.0	11.1	7.5	132.	242.	133.
4/ 2/79	245	16.0	11.1	7.5	131.	240.	132.
4/ 2/79	300	16.0	11.1	7.5	132.	242.	133.
4/ 2/79	315	16.0	11.1	7.5	134.	244.	135.
4/ 2/79	330	16.0	11.1	7.5	134.	244.	135.
4/ 2/79	345	16.0	11.1	7.5	134.	244.	135.
4/ 2/79	400	16.0	11.1	7.5	135.	247.	136.
4/ 2/79	415	16.3	11.1	7.5	133.	243.	134.
4/ 2/79	430	16.3	11.1	7.5	134.	244.	135.
4/ 2/79	445	16.3	11.1	7.5	134.	244.	135.
4/ 2/79	500	16.3	11.1	7.5	133.	243.	134.
4/ 2/79	515	13.3	11.1	7.5	132.	242.	133.
4/ 2/79	530	13.3	11.1	7.5	131.	240.	132.
4/ 2/79	545	13.3	11.1	7.5	131.	239.	132.
4/ 2/79	600	13.3	11.1	7.5	134.	244.	135.
4/ 2/79	615	13.3	11.1	7.5	132.	242.	133.
4/ 2/79	630	13.3	11.1	7.5	132.	242.	133.
4/ 2/79	645	13.3	11.1	7.5	132.	242.	133.
4/ 2/79	700	13.3	11.1	7.6	132.	242.	133.
4/ 2/79	715	13.3	11.0	7.6	134.	243.	134.
4/ 2/79	730	13.3	11.0	7.6	135.	245.	135.
4/ 2/79	745	13.3	11.0	7.6	136.	246.	136.
4/ 2/79	800	13.3	10.9	7.6	138.	248.	137.
4/ 2/79	815	13.5	10.9	7.6	141.	252.	139.
4/ 2/79	830	13.5	10.9	7.6	145.	259.	143.
4/ 2/79	845	13.5	10.7	7.6	146.	258.	142.
4/ 2/79	900	13.5	10.7	7.6	127.	225.	124.
4/ 2/79	915	14.4	8.1	9.1	117.	165.	91.
4/ 2/79	930	14.4	8.0	9.9	114.	158.	87.
4/ 2/79	945	14.4	8.1	10.0	116.	162.	89.
4/ 2/79	1000	14.4	8.2	10.0	117.	165.	91.
4/ 2/79	1015	16.6	8.2	10.0	115.	163.	90.
4/ 2/79	1030	16.6	8.2	10.0	117.	166.	91.
4/ 2/79	1045	16.6	7.9	10.0	119.	164.	90.
4/ 2/79	1100	16.6	7.9	10.0	118.	163.	90.
4/ 2/79	1115	16.6	7.9	10.0	117.	161.	89.
4/ 2/79	1130	16.6	7.9	10.0	119.	163.	90.
4/ 2/79	1145	16.6	7.9	10.0	119.	163.	90.
4/ 2/79	1200	16.6	7.9	10.0	119.	163.	90.

```
******************************************************************
**                         15 MIN. DATA                         **
**                 DRY STACK GAS CONCENTRATION                  **
**                                                              **
**                           O2      CO2     NO     NO     NO   **
**                   LOAD   VOL%    VOL%    PPMV   PPMV   NG/J  **
**    DATE   TIME    MWTH   MEAS    MEAS    MEAS   3%O2         **
******************************************************************
** 4/ 2/79   1215    16.6    7.8    10.0    120.   164.    91.  **
** 4/ 2/79   1230    16.6    7.8    10.0    120.   164.    91.  **
** 4/ 2/79   1245    16.6    7.8    10.0    120.   164.    91.  **
** 4/ 2/79   1300    16.6    7.8    10.0    120.   164.    90.  **
** 4/ 2/79   1315    16.7    7.7    10.0    119.   163.    90.  **
** 4/ 2/79   1330    16.7    7.7    10.0    119.   163.    90.  **
** 4/ 2/79   1345    16.7    7.7    10.0    119.   162.    89.  **
** 4/ 2/79   1400    16.7    7.7    10.1    119.   162.    89.  **
** 4/ 2/79   1415    16.7    7.7    10.1    116.   158.    87.  **
** 4/ 2/79   1430    16.7    7.7    10.1    116.   158.    87.  **
** 4/ 2/79   1445    16.7    7.7    10.1    117.   160.    88.  **
** 4/ 2/79   1500    16.7    7.7    10.1    119.   162.    89.  **
** 4/ 2/79   1515    16.8    7.7    10.1    119.   161.    89.  **
** 4/ 2/79   1530    16.8    7.7    10.1    117.   159.    88.  **
** 4/ 2/79   1545    16.8    7.7    10.1    119.   161.    89.  **
** 4/ 2/79   1600    16.8    7.6    10.1    117.   158.    87.  **
** 4/ 2/79   1615    17.0    8.1     9.8    125.   175.    97.  **
** 4/ 2/79   1630    17.0    8.2     9.7    127.   180.    99.  **
** 4/ 2/79   1645    17.0    8.2     9.7    129.   181.   100.  **
** 4/ 2/79   1700    17.0    8.2     9.7    130.   183.   101.  **
** 4/ 2/79   1715    16.4    8.2     9.7    129.   182.   100.  **
** 4/ 2/79   1730    16.4    8.2     9.7    127.   180.    99.  **
** 4/ 2/79   1745    16.4    8.2     9.7    127.   180.    99.  **
** 4/ 2/79   1800    16.4    8.2     9.7    127.   180.    99.  **
** 4/ 2/79   1815    16.3    8.2     9.7    127.   179.    99.  **
** 4/ 2/79   1830    16.3    8.2     9.7    127.   179.    99.  **
** 4/ 2/79   1845    16.3    8.2     9.7    127.   179.    99.  **
** 4/ 2/79   1900    16.3    8.2     9.7    126.   178.    98.  **
** 4/ 2/79   1915    16.1    8.6     9.2    127.   186.   103.  **
** 4/ 2/79   1930    16.1    8.6     9.3    130.   189.   104.  **
** 4/ 2/79   1945    16.1    8.6     9.3    130.   189.   104.  **
** 4/ 2/79   2000    16.1    8.6     9.3    131.   191.   105.  **
** 4/ 2/79   2015    16.1    8.6     9.3    132.   193.   106.  **
** 4/ 2/79   2030    16.1    8.6     9.3    132.   192.   106.  **
** 4/ 2/79   2045    16.1    8.6     9.3    132.   192.   106.  **
** 4/ 2/79   2100    16.1    8.6     9.3    132.   192.   106.  **
** 4/ 2/79   2115    16.1    8.6     9.3    132.   193.   106.  **
** 4/ 2/79   2130    16.1    8.6     9.3    132.   193.   106.  **
** 4/ 2/79   2145    16.1    8.6     9.3    131.   191.   105.  **
** 4/ 2/79   2200    16.1    8.6     9.3    131.   191.   105.  **
** 4/ 2/79   2215    16.0    8.6     9.3    131.   191.   105.  **
** 4/ 2/79   2230    16.0    8.6     9.3    131.   191.   105.  **
** 4/ 2/79   2245    16.0    8.6     9.3    130.   189.   104.  **
** 4/ 2/79   2300    16.0    8.6     9.3    129.   187.   103.  **
** 4/ 2/79   2315    16.0    8.5     9.3    126.   182.   100.  **
** 4/ 2/79   2330    16.0    8.5     9.3    125.   180.    99.  **
** 4/ 2/79   2345    16.0    8.5     9.3    122.   176.    97.  **
** 4/ 2/79   2400    16.0    8.4     9.3    122.   176.    97.  **
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**********************************************************************
**                        15 MIN, DATA                              **
**                 DRY STACK GAS CONCENTRATION                      **
**                                                                  **
**                          O2      CO2      NU      NO      NO     **
**                  LOAD   VOL%    VOL%    PPMV    PPMV    NG/J     **
**    DATE    TIME  MWTH   MEAS    MEAS    MEAS    3%O2             **
**********************************************************************
** 4/ 3/79      15  16.1    8.5     9.4    121.    174.     96.     **
** 4/ 3/79      30  16.1    8.4     9.4    120.    171.     95.     **
** 4/ 3/79      45  16.1    8.4     9.4    120.    171.     94.     **
** 4/ 3/79     100  16.1    8.3     9.4    121.    172.     95.     **
** 4/ 3/79     115  16.1    8.3     9.4    120.    170.     94.     **
** 4/ 3/79     130  16.1    8.3     9.4    119.    170.     94.     **
** 4/ 3/79     145  16.1    8.4     9.4    120.    172.     95.     **
** 4/ 3/79     200  16.1    8.4     9.4    120.    171.     95.     **
** 4/ 3/79     215  16.1    8.0     9.7    115.    160.     88.     **
** 4/ 3/79     230  16.1    7.9    10.0    109.    150.     83.     **
** 4/ 3/79     245  16.1    7.9    10.0    109.    150.     83.     **
** 4/ 3/79     300  16.1    7.9    10.0    107.    149.     82.     **
** 4/ 3/79     315  16.1    7.7    10.0    106.    145.     80.     **
** 4/ 3/79     330  16.1    8.2     9.8     -1.     -1.     -1.     **
** 4/ 3/79     345  16.1    7.7    10.0     -1.     -1.     -1.     **
** 4/ 3/79     400  16.1    7.7    10.0     -1.     -1.     -1.     **
** 4/ 3/79     415  16.1    7.7    10.0     -1.     -1.     -1.     **
** 4/ 3/79     430  16.1    7.6    10.0     -1.     -1.     -1.     **
** 4/ 3/79     445  16.1    7.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79     500  16.1    7.5    10.0     -1.     -1.     -1.     **
** 4/ 3/79     515  16.1    7.4    10.0     -1.     -1.     -1.     **
** 4/ 3/79     530  16.1    7.4    10.0     -1.     -1.     -1.     **
** 4/ 3/79     545  16.1    7.4    10.0     -1.     -1.     -1.     **
** 4/ 3/79     600  16.1    7.3    10.0     -1.     -1.     -1.     **
** 4/ 3/79     615  16.1    7.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79     630  16.1    7.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79     645  16.1    7.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79     700  16.1    7.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79     715  16.1    7.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79     730  16.1    7.3    10.0     -1.     -1.     -1.     **
** 4/ 3/79     745  16.1    7.4    10.0     -1.     -1.     -1.     **
** 4/ 3/79     800  16.1    7.4    10.0     -1.     -1.     -1.     **
** 4/ 3/79     815  16.4    7.3    10.0     -1.     -1.     -1.     **
** 4/ 3/79     830  16.4    7.3    10.0     -1.     -1.     -1.     **
** 4/ 3/79     845  16.4    7.7    10.0     -1.     -1.     -1.     **
** 4/ 3/79     900  16.4    7.6    10.0     -1.     -1.     -1.     **
** 4/ 3/79     915  16.3    7.6    10.0     -1.     -1.     -1.     **
** 4/ 3/79     930  16.3    7.6    10.0     -1.     -1.     -1.     **
** 4/ 3/79     945  16.3    8.0    10.0     -1.     -1.     -1.     **
** 4/ 3/79    1000  16.3    8.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79    1015  16.3    8.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79    1030  16.3    8.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79    1045  16.3    8.2    10.0     -1.     -1.     -1.     **
** 4/ 3/79    1100  16.3    8.3     9.9     -1.     -1.     -1.     **
** 4/ 3/79    1115  16.3    8.0     9.9     -1.     -1.     -1.     **
** 4/ 3/79    1130  16.3    7.9     9.9     -1.     -1.     -1.     **
** 4/ 3/79    1145  16.3    7.8     9.9     -1.     -1.     -1.     **
** 4/ 3/79    1200  16.3    7.8     9.9     -1.     -1.     -1.     **
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*******************************************************************
**                          15 MIN, DATA                         **
**                  DRY STACK GAS CONCENTRATION                  **
**                                                               **
**                               O2      CO2     NO      NO      NO      **
**                       LOAD    VOL%    VOL%    PPMV    PPMV    NG/J    **
**   DATE       TIME     MWTH    MEAS    MEAS    MEAS    3%O2            **
*******************************************************************
** 4/ 3/79      1215     16.3     7.8     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1230     16.3     7.8     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1245     16.3     7.9     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1300     16.3     8.2     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1315     16.1     8.3     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1330     16.1     8.5     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1345     16.1     8.0     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1400     16.1     8.0     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1415     16.1     8.0     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1430     16.1     8.0     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1445     16.1     8.0     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1500     16.1     8.1     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1515     16.0     7.6     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1530     16.0     7.8     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1545     16.0     7.7     9.9    -1.     -1.     -1.     **
** 4/ 3/79      1600     16.0     7.7    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1615     16.1     7.7    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1630     16.1     7.7    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1645     16.1     7.7    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1700     16.1     7.7    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1715     16.0     7.8    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1730     16.0     7.8    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1745     16.0     7.8    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1800     16.0     7.8    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1815     16.0     7.9    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1830     16.0     7.9    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1845     16.0     8.4    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1900     16.0     8.2    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1915     15.8     8.1    10.0    -1.     -1.     -1.     **
** 4/ 3/79      1930     15.8     8.1     9.6    -1.     -1.     -1.     **
** 4/ 3/79      1945     15.8     8.5     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2000     15.8     9.6     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2015     16.0     9.6     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2030     16.0     9.5     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2045     16.0     9.5     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2100     16.0     9.4     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2115     16.0     9.4     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2130     16.0     9.4     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2145     16.0     9.4     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2200     16.0     9.4     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2215     15.8     9.4     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2230     15.8     9.4     9.9    -1.     -1.     -1.     **
** 4/ 3/79      2245     15.8     9.4    10.0    -1.     -1.     -1.     **
** 4/ 3/79      2300     15.8     9.4    10.0    -1.     -1.     -1.     **
** 4/ 3/79      2315     16.0     8.1    10.0    -1.     -1.     -1.     **
** 4/ 3/79      2330     16.0     8.0    10.0    -1.     -1.     -1.     **
** 4/ 3/79      2345     16.0     7.9    10.0    -1.     -1.     -1.     **
** 4/ 3/79      2400     16.0     7.9    10.0    -1.     -1.     -1.     **
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*************************************************************
**                    15 MIN, DATA                        **
**            DRY STACK GAS CONCENTRATION                 **
**                                                        **
**                         O2     CO2     NO     NO     NO   **
**                  LOAD   VOL%   VOL%   PPMV   PPMV   NG/J  **
**  DATE      TIME  MWTH   MEAS   MEAS   MEAS   3%O2         **
*************************************************************
** 4/ 4/79      15  16.0    9.5   10.0    -1.    -1.    -1.  **
** 4/ 4/79      30  16.0    9.5   10.0    -1.    -1.    -1.  **
** 4/ 4/79      45  16.0    9.5   10.0    -1.    -1.    -1.  **
** 4/ 4/79     100  16.0    9.5   10.0    -1.    -1.    -1.  **
** 4/ 4/79     115  16.0    9.5   10.0    -1.    -1.    -1.  **
** 4/ 4/79     130  16.0    9.5   10.0    -1.    -1.    -1.  **
** 4/ 4/79     145  16.0    9.5   10.0    -1.    -1.    -1.  **
** 4/ 4/79     200  16.0    9.4   10.0    -1.    -1.    -1.  **
** 4/ 4/79     215  16.0    9.1   10.0    -1.    -1.    -1.  **
** 4/ 4/79     230  16.0    9.1   10.0    -1.    -1.    -1.  **
** 4/ 4/79     245  16.0    9.1   10.0    -1.    -1.    -1.  **
** 4/ 4/79     300  16.0    9.0   10.0    -1.    -1.    -1.  **
** 4/ 4/79     315  16.0    8.8   10.0    -1.    -1.    -1.  **
** 4/ 4/79     330  16.0    8.8   10.0    -1.    -1.    -1.  **
** 4/ 4/79     345  16.0    9.4   10.0    -1.    -1.    -1.  **
** 4/ 4/79     400  16.0    9.1   10.0    -1.    -1.    -1.  **
** 4/ 4/79     415  15.8    9.2   10.0    -1.    -1.    -1.  **
** 4/ 4/79     430  15.8    9.1   10.0    -1.    -1.    -1.  **
** 4/ 4/79     445  15.8    9.1    9.7    -1.    -1.    -1.  **
** 4/ 4/79     500  15.8    9.1    9.8    -1.    -1.    -1.  **
** 4/ 4/79     515  15.8    9.4    9.8    -1.    -1.    -1.  **
** 4/ 4/79     530  15.8    9.3    9.8    -1.    -1.    -1.  **
** 4/ 4/79     545  15.8    9.3    9.8    -1.    -1.    -1.  **
** 4/ 4/79     600  15.8    9.3    9.9    -1.    -1.    -1.  **
** 4/ 4/79     615  16.0    9.3    9.9    -1.    -1.    -1.  **
** 4/ 4/79     630  16.0    8.8    9.9    -1.    -1.    -1.  **
** 4/ 4/79     645  16.0    8.9    9.9    -1.    -1.    -1.  **
** 4/ 4/79     700  16.0    8.9    9.9    -1.    -1.    -1.  **
** 4/ 4/79     715  16.0    8.9    9.9    -1.    -1.    -1.  **
** 4/ 4/79     730  16.0    9.1   10.0    -1.    -1.    -1.  **
** 4/ 4/79     745  16.0    9.4   10.1    -1.    -1.    -1.  **
** 4/ 4/79     800  16.0    9.5   10.1    -1.    -1.    -1.  **
** 4/ 4/79     815  16.0    9.4   10.1    -1.    -1.    -1.  **
** 4/ 4/79     830  16.0    9.3   10.1    -1.    -1.    -1.  **
** 4/ 4/79     845  16.0    9.3   10.1    -1.    -1.    -1.  **
** 4/ 4/79     900  16.0    9.4   10.1    -1.    -1.    -1.  **
** 4/ 4/79     915  16.0    9.3   10.1    -1.    -1.    -1.  **
** 4/ 4/79     930  16.0    9.2   10.1    -1.    -1.    -1.  **
** 4/ 4/79     945  16.0    9.2   10.1    -1.    -1.    -1.  **
** 4/ 4/79    1000  16.0    7.7   10.1    -1.    -1.    -1.  **
** 4/ 4/79    1015  16.0    7.7   10.1    -1.    -1.    -1.  **
** 4/ 4/79    1030  16.0    7.7   10.1    -1.    -1.    -1.  **
** 4/ 4/79    1045  16.0    7.3   10.1    -1.    -1.    -1.  **
** 4/ 4/79    1100  16.0    7.6   10.1    -1.    -1.    -1.  **
** 4/ 4/79    1115  16.0    7.6   10.2    -1.    -1.    -1.  **
** 4/ 4/79    1130  16.0    7.6   10.2    -1.    -1.    -1.  **
** 4/ 4/79    1145  16.0    7.6   10.2    -1.    -1.    -1.  **
** 4/ 4/79    1200  16.0    7.6   10.2    -1.    -1.    -1.  **
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***********************************************************************
**                                                                   **
**                          15 MIN. DATA                             **
**                   DRY STACK GAS CONCENTRATION                     **
**                                                                   **
**                          O2      CO2     NU      NO      NO       **
**                  LOAD    VOL%    VOL%    PPMV    PPMV    NG/J     **
**   DATE    TIME   MWTH    MEAS    MEAS    MEAS    3%O2             **
***********************************************************************
** 4/ 4/79   1215   16.0     7.5    10.2     -1.     -1.     -1.     **
** 4/ 4/79   1230   16.0     7.5    10.2     -1.     -1.     -1.     **
** 4/ 4/79   1245   16.0     7.6    10.2     -1.     -1.     -1.     **
** 4/ 4/79   1300   16.0     7.6    10.3     -1.     -1.     -1.     **
** 4/ 4/79   1315   16.0     7.4    10.3     -1.     -1.     -1.     **
** 4/ 4/79   1330   16.0     7.4    10.3     -1.     -1.     -1.     **
** 4/ 4/79   1345   16.0     7.4      .0     -1.     -1.     -1.     **
** 4/ 4/79   1400   16.0     6.7    10.2     -1.     -1.     -1.     **
** 4/ 4/79   1415   16.0     7.6    10.1    125.    168.     92.     **
** 4/ 4/79   1430   16.0     7.6    10.2    127.    172.     95.     **
** 4/ 4/79   1445   16.0     8.5    10.2    127.    184.    101.     **
** 4/ 4/79   1500   16.0     8.6    10.2    131.    191.    105.     **
** 4/ 4/79   1515   16.0     8.7    10.2    130.    190.    105.     **
** 4/ 4/79   1530   16.0     7.9    10.2    122.    167.     92.     **
** 4/ 4/79   1545   16.0     7.9    10.2    122.    167.     92.     **
** 4/ 4/79   1600   16.0     7.2    10.2    122.    159.     88.     **
** 4/ 4/79   1615   16.0     7.2    10.2    122.    159.     88.     **
** 4/ 4/79   1630   16.0     7.2    10.2    122.    159.     88.     **
** 4/ 4/79   1645   16.0     7.2    10.2    122.    159.     88.     **
** 4/ 4/79   1700   16.0     7.1    10.2    121.    157.     86.     **
** 4/ 4/79   1715   16.0     7.0    10.1    122.    157.     67.     **
** 4/ 4/79   1730   16.0      .5    10.1    122.    107.     59.     **
** 4/ 4/79   1745   16.0    -1.0    10.1    123.    105.     58.     **
** 4/ 4/79   1800   16.0    -1.0    10.2    123.    104.     57.     **
** 4/ 4/79   1815   16.0    -1.0    10.2    123.    104.     58.     **
** 4/ 4/79   1830   16.0    -1.0    10.2    124.    105.     58.     **
** 4/ 4/79   1845   16.0     7.2    10.2    124.    162.     89.     **
** 4/ 4/79   1900   16.0     7.2    10.2    125.    163.     90.     **
** 4/ 4/79   1915   16.3     7.1    10.2    126.    164.     90.     **
** 4/ 4/79   1930   16.3     7.1    10.2    125.    163.     90.     **
** 4/ 4/79   1945   16.3     7.1    10.2    126.    163.     90.     **
** 4/ 4/79   2000   16.3     7.1     9.8    123.    160.     88.     **
** 4/ 4/79   2015   16.3     7.1    10.0    122.    158.     87.     **
** 4/ 4/79   2030   16.3    -1.0    10.1    122.    104.     57.     **
** 4/ 4/79   2045   16.3    -1.0    10.1    122.    104.     57.     **
** 4/ 4/79   2100   16.3    -1.0    10.1    123.    104.     57.     **
** 4/ 4/79   2115   16.3    -1.0    10.1    122.    104.     57.     **
** 4/ 4/79   2130   16.3    -1.0    10.1    124.    105.     58.     **
** 4/ 4/79   2145   16.3    -1.0    10.1    124.    105.     58.     **
** 4/ 4/79   2200   16.3     7.1    10.1    125.    162.     89.     **
** 4/ 4/79   2215   16.3     7.1    10.1    125.    162.     89.     **
** 4/ 4/79   2230   16.3     7.2    10.1    124.    163.     90.     **
** 4/ 4/79   2245   16.3     7.2    10.1    124.    162.     89.     **
** 4/ 4/79   2300   16.3     7.2    10.1    124.    162.     89.     **
** 4/ 4/79   2315   16.1     7.2    10.1    119.    156.     86.     **
** 4/ 4/79   2330   16.1     7.2    10.1    119.    155.     86.     **
** 4/ 4/79   2345   16.1     7.2    10.1    118.    155.     85.     **
** 4/ 4/79   2400   16.1     7.2    10.1    119.    155.     86.     **
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******************************************************************
**                          15 MIN. DATA                          **
**                 DRY STACK GAS CONCENTRATION                    **
**                                                                **
**                              O2      CO2     NO      NO    NO  **
**                     LOAD    VOL%    VOL%    PPMV    PPMV  NG/J **
**   DATE     TIME     MWTH    MEAS    MEAS    MEAS    3%O2       **
******************************************************************
** 4/ 5/79      15     16.3     7.2    10.0    120.    157.   86.  **
** 4/ 5/79      30     16.3     7.2    10.0    121.    158.   87.  **
** 4/ 5/79      45     16.3     7.2    10.0    122.    160.   88.  **
** 4/ 5/79     100     16.3     7.2    10.0    122.    160.   88.  **
** 4/ 5/79     115     16.3     7.2    10.0    121.    158.   87.  **
** 4/ 5/79     130     16.3     7.2    10.0    121.    158.   87.  **
** 4/ 5/79     145     16.3     7.2    10.0    122.    159.   88.  **
** 4/ 5/79     200     16.3     7.2    10.0    122.    159.   88.  **
** 4/ 5/79     215     16.3     7.2    10.0    121.    158.   87.  **
** 4/ 5/79     230     16.3     7.2    10.0    121.    158.   87.  **
** 4/ 5/79     245     16.3     7.2    10.0    121.    158.   87.  **
** 4/ 5/79     300     16.3     7.2    10.0    121.    158.   87.  **
** 4/ 5/79     315     16.3     7.2    10.0    122.    160.   88.  **
** 4/ 5/79     330     16.3     7.7    10.0    122.    166.   92.  **
** 4/ 5/79     345     16.3     7.6    10.0    129.    174.   96.  **
** 4/ 5/79     400     16.3     7.6    10.0    129.    174.   96.  **
** 4/ 5/79     415     16.3     7.6    10.0    129.    174.   96.  **
** 4/ 5/79     430     16.3     7.6    10.0    130.    175.   96.  **
** 4/ 5/79     445     16.3     7.4    10.0    131.    174.   96.  **
** 4/ 5/79     500     16.3     7.4     9.5    130.    173.   95.  **
** 4/ 5/79     515     16.1     7.4     9.7    130.    173.   95.  **
** 4/ 5/79     530     16.1     7.4     9.7    131.    174.   96.  **
** 4/ 5/79     545     16.1     7.4     9.7    135.    180.   99.  **
** 4/ 5/79     600     16.1     7.4     9.7    136.    181.  100.  **
** 4/ 5/79     615     16.0     7.4     9.8    136.    181.  100.  **
** 4/ 5/79     630     16.0     7.1     9.8    135.    175.   97.  **
** 4/ 5/79     645     16.0     7.1     9.8    132.    172.   95.  **
** 4/ 5/79     700     16.0     7.1     9.8    134.    174.   96.  **
** 4/ 5/79     715     16.1     7.1     9.8    138.    179.   99.  **
** 4/ 5/79     730     16.1     7.1     9.8    139.    181.  100.  **
** 4/ 5/79     745     16.1     7.2     9.8    132.    173.   95.  **
** 4/ 5/79     800     16.1     7.2    10.1    131.    171.   94.  **
** 4/ 5/79     815     16.3     7.1    10.1    128.    167.   92.  **
** 4/ 5/79     830     16.3     7.1    10.1    132.    172.   95.  **
** 4/ 5/79     845     16.3     7.4    10.1    137.    183.  101.  **
** 4/ 5/79     900     16.3     7.4    10.1    127.    170.   94.  **
** 4/ 5/79     915     16.1     7.4    10.1    113.    150.   83.  **
** 4/ 5/79     930     16.1     7.4    10.1    113.    150.   83.  **
** 4/ 5/79     945     16.1     7.4    10.1    126.    168.   93.  **
** 4/ 5/79    1000     16.1     7.4    10.1    126.    168.   93.  **
** 4/ 5/79    1015     15.8     7.4    10.1    125.    167.   92.  **
** 4/ 5/79    1030     15.8     7.4    10.0    124.    165.   91.  **
** 4/ 5/79    1045     15.8     7.4    10.0    124.    165.   91.  **
** 4/ 5/79    1100     15.8     7.4    10.0    125.    167.   92.  **
** 4/ 5/79    1115     16.3     7.4    10.0    125.    167.   92.  **
** 4/ 5/79    1130     16.3     7.4    10.0    125.    166.   92.  **
** 4/ 5/79    1145     16.3     7.4    10.0    125.    166.   91.  **
** 4/ 5/79    1200     16.3     7.4    10.1    125.    167.   92.  **
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*******************************************************************
**                        15 MIN. DATA                          **
**                DRY STACK GAS CONCENTRATION                   **
**                                                              **
**                           O2     CO2     NO      NO      NO  **
**                   LOAD    VOL%   VOL%    PPMV    PPMV   NG/J **
**   DATE     TIME   MWTH    MEAS   MEAS    MEAS    3%O2        **
*******************************************************************
** 4/ 5/79    1215   16.1    7.4    10.1    126.    167.    92. **
** 4/ 5/79    1230   16.1    7.4    10.0    126.    166.    92. **
** 4/ 5/79    1245   16.1    7.2    10.0    126.    165.    91. **
** 4/ 5/79    1300   16.1    7.2    10.0    130.    170.    94. **
** 4/ 5/79    1315   16.1    7.1    10.1    132.    172.    95. **
** 4/ 5/79    1330   16.1    7.1    10.1    125.    162.    89. **
** 4/ 5/79    1345   16.1    7.1    10.1    126.    164.    90. **
** 4/ 5/79    1400   16.1    7.1    10.1    127.    166.    91. **
** 4/ 5/79    1415   16.1    7.1    10.2    124.    161.    89. **
** 4/ 5/79    1430   16.1    7.1    10.2    122.    159.    88. **
** 4/ 5/79    1445   16.1    7.1    10.2    122.    158.    87. **
** 4/ 5/79    1500   16.1    7.1    10.2    123.    160.    88. **
** 4/ 5/79    1515   16.1    7.1    10.2    123.    160.    88. **
** 4/ 5/79    1530   16.1    7.1    10.2    123.    159.    88. **
** 4/ 5/79    1545   16.1    7.1    10.2    122.    158.    87. **
** 4/ 5/79    1600   16.1    7.1    10.2    122.    159.    87. **
** 4/ 5/79    1615   16.1    7.2    10.2    123.    161.    89. **
** 4/ 5/79    1630   16.1    7.2    10.2    124.    162.    89. **
** 4/ 5/79    1645   16.1    7.2    10.2    123.    161.    89. **
** 4/ 5/79    1700   16.1    7.2    10.2    124.    163.    90. **
** 4/ 5/79    1715   16.1    7.2    10.2    124.    162.    90. **
** 4/ 5/79    1730   16.1    7.2    10.1    124.    162.    89. **
** 4/ 5/79    1745   16.1    7.1    10.1    121.    157.    86. **
** 4/ 5/79    1800   16.1    7.1    10.1    120.    156.    86. **
** 4/ 5/79    1815   16.1    7.2    10.1    120.    157.    86. **
** 4/ 5/79    1830   16.1    7.2    10.2    119.    155.    85. **
** 4/ 5/79    1845   16.1    7.2    10.2    119.    156.    86. **
** 4/ 5/79    1900   16.1    7.2    10.2    119.    155.    85. **
** 4/ 5/79    1915   18.2    7.2    10.2    118.    155.    85. **
** 4/ 5/79    1930   18.2    6.9    10.2    174.    222.   122. **
** 4/ 5/79    1945   18.2    6.6    10.2    172.    216.   119. **
** 4/ 5/79    2000   18.2    6.7    10.2    176.    223.   123. **
** 4/ 5/79    2015   18.2    7.2    10.2    172.    226.   125. **
** 4/ 5/79    2030   18.2    7.3    10.5    172.    227.   125. **
** 4/ 5/79    2045   18.2    7.3    10.6    115.    151.    83. **
** 4/ 5/79    2100   18.2    7.3    10.5    114.    151.    83. **
** 4/ 5/79    2115   16.3    7.3    10.2    114.    150.    83. **
** 4/ 5/79    2130   16.3    7.3    10.2    113.    149.    82. **
** 4/ 5/79    2145   16.3    7.4    10.2    112.    149.    82. **
** 4/ 5/79    2200   16.3    7.4    10.2    112.    148.    82. **
** 4/ 5/79    2215   16.3    7.4    10.2    111.    148.    81. **
** 4/ 5/79    2230   16.3    7.3    10.2    111.    146.    81. **
** 4/ 5/79    2245   16.3    7.4    10.1    109.    145.    80. **
** 4/ 5/79    2300   16.3    7.4    10.1    110.    145.    80. **
** 4/ 5/79    2315   16.3    7.4    10.1    111.    147.    81. **
** 4/ 5/79    2330   16.3    7.3    10.1    110.    145.    80. **
** 4/ 5/79    2345   16.3    7.3    10.1    107.    141.    78. **
** 4/ 5/79    2400   16.3    7.2    10.1    107.    141.    78. **
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************************************************************************
**                            15 MIN. DATA                            **
**                    DRY STACK GAS CONCENTRATION                     **
**                                                                    **
**                             O2     CO2      NO      NO      NO     **
**                 LOAD    VOL%    VOL%    PPMV    PPMV    NG/J     **
**   DATE      TIME  MWTH    MEAS    MEAS    MEAS    3%O2             **
************************************************************************
** 4/ 6/79       15  17.9     7.2    10.2    108.    141.     78.     **
** 4/ 6/79       30  17.9     7.2    10.2    108.    142.     78.     **
** 4/ 6/79       45  17.9     7.2    10.2    109.    143.     79.     **
** 4/ 6/79      100  17.9     7.2    10.2    109.    142.     78.     **
** 4/ 6/79      115  19.3     7.2    10.2    109.    142.     78.     **
** 4/ 6/79      130  19.3     7.2    10.2    109.    142.     78.     **
** 4/ 6/79      145  19.3     7.2    10.2    107.    140.     77.     **
** 4/ 6/79      200  19.3     7.1    10.2    106.    137.     76.     **
** 4/ 6/79      215  19.6     7.1    10.2    106.    138.     76.     **
** 4/ 6/79      230  19.6     7.1    10.3    104.    134.     74.     **
** 4/ 6/79      245  19.6     7.1    10.3    107.    139.     76.     **
** 4/ 6/79      300  19.6     7.1    10.3    108.    140.     77.     **
** 4/ 6/79      315  19.3     7.1    10.3    110.    142.     79.     **
** 4/ 6/79      330  19.3     7.0    10.3    111.    144.     79.     **
** 4/ 6/79      345  19.3     7.0    10.2    112.    144.     80.     **
** 4/ 6/79      400  19.3     7.0    10.2    113.    146.     80.     **
** 4/ 6/79      415  18.2     7.0    10.2    115.    148.     82.     **
** 4/ 6/79      430  18.2     7.0    10.2    119.    153.     84.     **
** 4/ 6/79      445  18.2     6.9    10.2    118.    151.     83.     **
** 4/ 6/79      500  18.2     6.9    10.2    119.    153.     85.     **
** 4/ 6/79      515  16.1     7.0    10.2    122.    158.     87.     **
** 4/ 6/79      530  16.1     7.1    10.2    125.    162.     90.     **
** 4/ 6/79      545  16.1     7.2    10.2    126.    164.     91.     **
** 4/ 6/79      600  16.1     7.2     9.8    127.    167.     92.     **
** 4/ 6/79      615  16.1     7.2    10.1    130.    171.     94.     **
** 4/ 6/79      630  16.1     7.3    10.0    132.    174.     96.     **
** 4/ 6/79      645  16.1     7.2    10.0    129.    170.     94.     **
** 4/ 6/79      700  16.1     7.2    10.0    129.    170.     93.     **
** 4/ 6/79      715  16.1     7.2    10.0    130.    170.     94.     **
** 4/ 6/79      730  16.1     7.2    10.0    130.    171.     94.     **
** 4/ 6/79      745  16.1     7.2    10.0    134.    175.     97.     **
** 4/ 6/79      800  16.1     7.2    10.0    137.    179.     99.     **
** 4/ 6/79      815  16.1     7.1    10.0    138.    179.     99.     **
** 4/ 6/79      830  16.1     7.2    10.0    141.    184.    101.     **
** 4/ 6/79      845  16.1     7.2    10.0    141.    184.    101.     **
** 4/ 6/79      900  16.1     7.4    10.0    140.    185.    102.     **
** 4/ 6/79      915  16.1     7.4    10.0    135.    180.     99.     **
** 4/ 6/79      930  16.1     7.4    10.0    133.    177.     98.     **
** 4/ 6/79      945  16.1     7.4    10.0    134.    179.     99.     **
** 4/ 6/79     1000  16.1     7.4    10.0    125.    166.     92.     **
** 4/ 6/79     1015  16.1     7.2    10.0    123.    162.     89.     **
** 4/ 6/79     1030  16.1     7.3    10.1    124.    163.     90.     **
** 4/ 6/79     1045  16.1     7.3    10.0    124.    163.     90.     **
** 4/ 6/79     1100  16.1     7.2     9.9    123.    161.     89.     **
** 4/ 6/79     1115  16.1     7.2     9.9    123.    161.     89.     **
** 4/ 6/79     1130  16.1     7.2     9.9    125.    164.     90.     **
** 4/ 6/79     1145  16.1     7.3    10.0    122.    161.     89.     **
** 4/ 6/79     1200  16.1     7.2    10.0    121.    159.     87.     **
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******************************************************************
**                         15 MIN. DATA                          **
**                  DRY STACK GAS CONCENTRATION                  **
**                                                               **
**                            O2      CO2     NO     NO     NO   **
**                    LOAD   VOL%    VOL%    PPMV   PPMV   NG/J  **
**   DATE     TIME    MWTH   MEAS    MEAS    MEAS   3%O2         **
******************************************************************
** 4/ 6/79    1215    16.1    7.2     9.9    122.   160.    88.  **
** 4/ 6/79    1230    16.1    7.3    10.0    123.   162.    89.  **
** 4/ 6/79    1245    16.1    7.2    10.1    122.   161.    89.  **
** 4/ 6/79    1300    16.1    7.2    10.1    121.   158.    87.  **
** 4/ 6/79    1315    16.3    7.3    10.1    121.   159.    88.  **
** 4/ 6/79    1330    16.3    7.3    10.1    122.   161.    89.  **
** 4/ 6/79    1345    16.3    7.3    10.1    121.   160.    88.  **
** 4/ 6/79    1400    16.3    7.2    10.1    124.   163.    90.  **
** 4/ 6/79    1415    16.3    7.2    10.1    125.   164.    90.  **
** 4/ 6/79    1430    16.3    7.2    10.1    127.   166.    91.  **
** 4/ 6/79    1445    16.3    7.2    10.1    125.   164.    90.  **
** 4/ 6/79    1500    16.3    7.2    10.1    125.   164.    90.  **
** 4/ 6/79    1515    16.3    7.2    10.1    124.   162.    90.  **
** 4/ 6/79    1530    16.3    7.2    10.1    124.   162.    90.  **
** 4/ 6/79    1545    16.3    7.2    10.1    124.   162.    90.  **
** 4/ 6/79    1600    16.3    7.2    10.1    124.   162.    89.  **
** 4/ 6/79    1615    16.3    7.2    10.1    124.   163.    90.  **
** 4/ 6/79    1630    16.3    7.2    10.1    124.   163.    90.  **
** 4/ 6/79    1645    16.3    7.2    10.1    125.   163.    90.  **
** 4/ 6/79    1700    16.3    7.2    10.1    124.   162.    90.  **
** 4/ 6/79    1715    16.3    7.6    10.1    124.   167.    92.  **
** 4/ 6/79    1730    16.3    7.7    10.1    124.   167.    92.  **
** 4/ 6/79    1745    16.3    7.0    10.1    124.   160.    88.  **
** 4/ 6/79    1800    16.3    6.8    10.1    125.   159.    88.  **
** 4/ 6/79    1815    17.9    6.8    10.1    126.   160.    88.  **
** 4/ 6/79    1830    17.9    6.7    10.2    126.   159.    88.  **
** 4/ 6/79    1845    17.9    6.7    10.2    126.   160.    88.  **
** 4/ 6/79    1900    17.9    6.9    10.2    127.   162.    90.  **
** 4/ 6/79    1915    16.4    6.9    10.2    129.   165.    91.  **
** 4/ 6/79    1930    16.4    6.5    10.2    175.   218.   120.  **
** 4/ 6/79    1945    16.4    6.5    10.2    169.   210.   116.  **
** 4/ 6/79    2000    16.4    7.1    10.1    167.   217.   120.  **
** 4/ 6/79    2015    16.3    6.9    10.5    120.   153.    84.  **
** 4/ 6/79    2030    16.3    6.8    10.5    120.   153.    84.  **
** 4/ 6/79    2045    16.3    6.8     9.9    119.   151.    83.  **
** 4/ 6/79    2100    16.3    6.8    10.0    119.   151.    83.  **
** 4/ 6/79    2115    16.3    6.9    10.1    119.   152.    84.  **
** 4/ 6/79    2130    16.3    6.8    10.1    118.   150.    83.  **
** 4/ 6/79    2145    16.3    6.8    10.2    118.   150.    83.  **
** 4/ 6/79    2200    16.3    6.8    10.2    116.   148.    82.  **
** 4/ 6/79    2215    16.3    6.8    10.2    116.   148.    82.  **
** 4/ 6/79    2230    16.3    6.8    10.2    117.   149.    82.  **
** 4/ 6/79    2245    16.3    6.8    10.2    116.   148.    82.  **
** 4/ 6/79    2300    16.3    6.8    11.9    118.   150.    83.  **
** 4/ 6/79    2315    16.3    6.9    10.2    116.   149.    82.  **
** 4/ 6/79    2330    16.3    6.9    10.2    115.   147.    81.  **
** 4/ 6/79    2345    16.3    6.9    10.2    114.   147.    81.  **
** 4/ 6/79    2400    16.3    6.9    10.2    115.   147.    81.  **
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**                        15 MIN. DATA                      **
**                DRY STACK GAS CONCENTRATION               **
**                                                          **
**                          O2     CO2     NO     NO    NO  **
**                  LOAD   VOL%   VOL%   PPMV   PPMV  NG/J  **
**   DATE    TIME   MWTH   MEAS   MEAS   MEAS   3%O2        **
**************************************************************
** 4/ 7/79     15   16.3    6.9   10.2   114.   146.   80.  **
** 4/ 7/79     30   16.3    6.9   10.2   112.   143.   79.  **
** 4/ 7/79     45   16.3    6.9   10.2   112.   143.   79.  **
** 4/ 7/79    100   16.3    6.9   10.2   114.   146.   80.  **
** 4/ 7/79    115   16.3    6.9   10.2   117.   149.   82.  **
** 4/ 7/79    130   16.3    6.9   10.2   150.   191.  105.  **
** 4/ 7/79    145   16.3    6.9   10.2   170.   218.  120.  **
** 4/ 7/79    200   16.3    6.5   10.3   172.   213.  118.  **
** 4/ 7/79    215   16.3    6.4   10.3   174.   215.  118.  **
** 4/ 7/79    230   16.3    6.4   10.2   170.   211.  116.  **
** 4/ 7/79    245   16.3    6.5   10.4   170.   211.  117.  **
** 4/ 7/79    300   16.3    6.6   10.6   171.   215.  118.  **
** 4/ 7/79    315   16.3    6.5   10.6   171.   213.  117.  **
** 4/ 7/79    330   16.3    6.4   10.6   172.   213.  117.  **
** 4/ 7/79    345   16.3    6.4   10.5   170.   211.  116.  **
** 4/ 7/79    400   16.3    6.4   10.5   171.   212.  117.  **
** 4/ 7/79    415   17.3    6.6   10.6   170.   213.  118.  **
** 4/ 7/79    430   17.3    6.5   10.6   170.   211.  117.  **
** 4/ 7/79    445   17.3    6.6   10.6   170.   212.  117.  **
** 4/ 7/79    500   17.3    6.6   10.6   168.   210.  116.  **
** 4/ 7/79    515   18.5    6.6   10.5   166.   208.  115.  **
** 4/ 7/79    530   18.5    6.9   10.5   167.   214.  118.  **
** 4/ 7/79    545   18.5    7.2   10.5   166.   217.  120.  **
** 4/ 7/79    600   18.5    6.9   10.6   165.   211.  116.  **
** 4/ 7/79    615   18.0    6.6   10.4   161.   202.  111.  **
** 4/ 7/79    630   18.0    7.1   10.1   161.   209.  115.  **
** 4/ 7/79    645   18.0    7.2   10.1   160.   209.  115.  **
** 4/ 7/79    700   18.0    7.1   10.4   160.   208.  115.  **
** 4/ 7/79    715   18.5    6.7   10.4   162.   206.  113.  **
** 4/ 7/79    730   18.5    6.4   10.0   162.   201.  111.  **
** 4/ 7/79    745   18.5    6.4   10.0   161.   200.  110.  **
** 4/ 7/79    800   18.5    6.4   10.2   161.   200.  110.  **
** 4/ 7/79    815   18.5    6.5   10.6   164.   204.  112.  **
** 4/ 7/79    830   18.5    6.5   10.7   165.   205.  113.  **
** 4/ 7/79    845   18.5    6.4   10.6   165.   204.  113.  **
** 4/ 7/79    900   18.5    6.4   10.6   166.   206.  114.  **
** 4/ 7/79    915   18.5    6.4   10.6   167.   207.  114.  **
** 4/ 7/79    930   18.5    6.4   10.6   167.   207.  114.  **
** 4/ 7/79    945   18.5    6.5   10.6   169.   211.  116.  **
** 4/ 7/79   1000   18.5    6.5   10.6   170.   211.  117.  **
** 4/ 7/79   1015   18.5    6.4   10.6   169.   210.  116.  **
** 4/ 7/79   1030   18.5    6.5   10.6   169.   211.  116.  **
** 4/ 7/79   1045   18.5    6.5   10.6   169.   210.  116.  **
** 4/ 7/79   1100   18.5    6.5   10.6   172.   213.  118.  **
** 4/ 7/79   1115   18.6    6.5   10.6   179.   222.  123.  **
** 4/ 7/79   1130   18.6    6.4   10.6   180.   223.  123.  **
** 4/ 7/79   1145   18.6    6.4   10.6   182.   226.  125.  **
** 4/ 7/79   1200   18.6    6.4   10.6   188.   232.  128.  **
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**                          15 MIN. DATA                            **
**                  DRY STACK GAS CONCENTRATION                     **
**                                                                  **
**                             O2      CO2     NO     NO     NO     **
**                     LOAD   VOL%    VOL%   PPMV   PPMV   NG/J     **
**   DATE       TIME   MWTH   MEAS    MEAS   MEAS   3%O2            **
**********************************************************************
** 4/ 7/79      1215   18.8    6.4    10.6   189.   233.   129.    **
** 4/ 7/79      1230   18.8    6.4    10.6   189.   234.   129.    **
** 4/ 7/79      1245   18.8    6.4    10.6   188.   231.   128.    **
** 4/ 7/79      1300   18.8    6.4    10.6   188.   231.   127.    **
** 4/ 7/79      1315   18.2    6.4    10.6   191.   237.   130.    **
** 4/ 7/79      1330   18.2    6.7    10.6   191.   242.   133.    **
** 4/ 7/79      1345   18.2    6.7    10.6   191.   240.   133.    **
** 4/ 7/79      1400   18.2    6.8    10.6   190.   241.   133.    **
** 4/ 7/79      1415   17.6    6.6    10.5   174.   218.   120.    **
** 4/ 7/79      1430   17.6    6.5    10.5   175.   218.   120.    **
** 4/ 7/79      1445   17.6    6.5    10.5   177.   220.   121.    **
** 4/ 7/79      1500   17.6    6.5    10.6   177.   221.   122.    **
** 4/ 7/79      1515   16.4    6.7    10.3   172.   218.   120.    **
** 4/ 7/79      1530   16.4    6.9    10.2   129.   165.    91.    **
** 4/ 7/79      1545   16.4    6.9    10.2   130.   166.    91.    **
** 4/ 7/79      1600   16.4    6.9    10.2   130.   166.    91.    **
** 4/ 7/79      1615   16.4    6.9    10.2   132.   169.    93.    **
** 4/ 7/79      1630   16.4    6.9    10.2   134.   171.    94.    **
** 4/ 7/79      1645   16.4    6.9    10.2   135.   173.    95.    **
** 4/ 7/79      1700   16.4    6.9    10.2   135.   173.    96.    **
** 4/ 7/79      1715   16.4    6.9    10.2   135.   173.    95.    **
** 4/ 7/79      1730   16.4    6.9    10.2   132.   170.    94.    **
** 4/ 7/79      1745   16.4    6.9    10.2   132.   170.    94.    **
** 4/ 7/79      1800   16.4    6.9    10.2   132.   170.    94.    **
** 4/ 7/79      1815   16.4    7.0    10.2   132.   170.    94.    **
** 4/ 7/79      1830   16.4    7.0    10.2   132.   171.    94.    **
** 4/ 7/79      1845   16.4    7.0    10.2   132.   170.    94.    **
** 4/ 7/79      1900   16.4    7.0    10.2   132.   170.    94.    **
** 4/ 7/79      1915   16.7    7.0    10.2   132.   171.    94.    **
** 4/ 7/79      1930   16.7    7.2    10.2   132.   174.    96.    **
** 4/ 7/79      1945   16.7    7.2    10.2   132.   173.    95.    **
** 4/ 7/79      2000   16.7    7.2    10.2   132.   172.    95.    **
** 4/ 7/79      2015   16.4    7.1    10.2   131.   171.    94.    **
** 4/ 7/79      2030   16.4    7.2    10.2   130.   170.    93.    **
** 4/ 7/79      2045   16.4    7.2    10.2   127.   166.    92.    **
** 4/ 7/79      2100   16.4    7.2    10.2   124.   162.    90.    **
** 4/ 7/79      2115   16.4    7.2    10.2   122.   160.    88.    **
** 4/ 7/79      2130   16.4    7.2    10.2   122.   160.    88.    **
** 4/ 7/79      2145   16.4    7.2    10.2   122.   160.    88.    **
** 4/ 7/79      2200   16.4    7.2    10.2   124.   162.    89.    **
** 4/ 7/79      2215   16.4    7.2    10.2   122.   160.    88.    **
** 4/ 7/79      2230   16.4    7.2    10.2   121.   158.    87.    **
** 4/ 7/79      2245   16.4    7.2    10.2   122.   159.    88.    **
** 4/ 7/79      2300   16.4    7.2    10.2   120.   157.    86.    **
** 4/ 7/79      2315   16.1    7.2    10.2   121.   159.    88.    **
** 4/ 7/79      2330   16.1    7.2    10.2   121.   158.    87.    **
** 4/ 7/79      2345   16.1    7.2    10.2   121.   159.    88.    **
** 4/ 7/79      2400   16.1    7.2    10.2   120.   158.    87.    **
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**                                                                  **
**                          15 MIN, DATA                            **
**                  DRY STACK GAS CONCENTRATION                     **
**                                                                  **
**                              O2      CO2      NO      NO     NO  **
**                      LOAD   VOL%    VOL%     PPMV    PPMV   NG/J **
**    DATE        TIME  MWTH   MEAS    MEAS     MEAS    3%O2        **
**********************************************************************
** 4/ 8/79          15  21.1    7.2    10.2     120.    157.    87. **
** 4/ 8/79          30  21.1    7.2    10.2     119.    156.    86. **
** 4/ 8/79          45  21.1    7.2    10.2     117.    154.    85. **
** 4/ 8/79         100  21.1    7.2    10.2     116.    152.    84. **
** 4/ 8/79         115  21.1    7.3    10.2     119.    157.    86. **
** 4/ 8/79         130  21.1    7.3    10.2     118.    156.    86. **
** 4/ 8/79         145  21.1    7.3    10.2     117.    155.    85. **
** 4/ 8/79         200  21.1    7.3    10.2     115.    151.    83. **
** 4/ 8/79         215  21.1    7.3    10.2     114.    151.    83. **
** 4/ 8/79         230  21.1    7.3    10.2     113.    149.    82. **
** 4/ 8/79         245  21.1    7.3    10.1     114.    150.    83. **
** 4/ 8/79         300  21.1    7.3    10.1     113.    149.    82. **
** 4/ 8/79         315  21.1    7.3    10.1     112.    148.    82. **
** 4/ 8/79         330  21.1    7.3    10.1     110.    145.    80. **
** 4/ 8/79         345  21.1    7.3    10.1     109.    143.    79. **
** 4/ 8/79         400  21.1    7.3    10.1     110.    145.    80. **
** 4/ 8/79         415  21.1    7.3    10.1     110.    146.    80. **
** 4/ 8/79         430  21.1    7.3    10.1     111.    146.    81. **
** 4/ 8/79         445  21.1    7.3    10.1     111.    146.    81. **
** 4/ 8/79         500  21.1    7.0    10.1     109.    141.    78. **
** 4/ 8/79         515  20.5    6.6    10.6     159.    200.   110. **
** 4/ 8/79         530  20.5    6.6    10.8     157.    196.   108. **
** 4/ 8/79         545  20.5    6.6    10.8     158.    198.   109. **
** 4/ 8/79         600  20.5    6.6    10.8     162.    203.   112. **
** 4/ 8/79         615  20.5    6.5    10.8     160.    199.   109. **
** 4/ 8/79         630  20.5    6.4    10.8     159.    197.   109. **
** 4/ 8/79         645  20.5    6.5    10.8     159.    198.   109. **
** 4/ 8/79         700  20.5    6.4    10.8     162.    201.   111. **
** 4/ 8/79         715  20.5    6.4    10.9     161.    199.   110. **
** 4/ 8/79         730  20.5    6.4    10.9     165.    204.   113. **
** 4/ 8/79         745  20.5    6.4    10.9     164.    203.   112. **
** 4/ 8/79         800  20.5    6.4    10.9     164.    203.   112. **
** 4/ 8/79         815  20.5    6.4    10.9     164.    203.   112. **
** 4/ 8/79         830  20.5    6.4    10.9     167.    206.   114. **
** 4/ 8/79         845  20.5    6.4    10.9     167.    207.   114. **
** 4/ 8/79         900  20.5    6.5    10.9     167.    208.   115. **
** 4/ 8/79         915  20.4    6.7    10.8     171.    215.   119. **
** 4/ 8/79         930  20.4    6.6    10.7     170.    213.   118. **
** 4/ 8/79         945  20.4    6.6    10.7     169.    212.   117. **
** 4/ 8/79        1000  20.4    6.7    10.7     169.    212.   117. **
** 4/ 8/79        1015  19.9    6.6    10.7     170.    213.   118. **
** 4/ 8/79        1030  19.9    6.6    10.7     171.    214.   118. **
** 4/ 8/79        1045  19.9    6.7    10.7     174.    221.   122. **
** 4/ 8/79        1100  19.9    7.0    10.6     172.    222.   122. **
** 4/ 8/79        1115  19.6    7.1    10.3     172.    223.   123. **
** 4/ 8/79        1130  19.6    6.9    10.3     175.    223.   123. **
** 4/ 8/79        1145  19.6    6.7    10.5     182.    229.   126. **
** 4/ 8/79        1200  19.6    6.6    10.6     182.    227.   125. **
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
4/ 8/79	1215	20.8	6.3	10.6	182.	222.	123.
4/ 8/79	1230	20.8	6.2	10.8	184.	225.	124.
4/ 8/79	1245	20.8	6.2	10.9	184.	224.	124.
4/ 8/79	1300	20.8	6.1	10.9	182.	221.	122.
4/ 8/79	1315	20.5	6.2	10.9	180.	219.	121.
4/ 8/79	1330	20.5	6.2	10.8	180.	219.	121.
4/ 8/79	1345	20.5	6.2	10.8	179.	219.	121.
4/ 8/79	1400	20.5	6.3	10.8	177.	217.	120.
4/ 8/79	1415	20.5	6.2	10.8	176.	215.	118.
4/ 8/79	1430	20.5	6.3	10.8	177.	217.	120.
4/ 8/79	1445	20.5	6.3	10.8	179.	219.	121.
4/ 8/79	1500	20.5	6.4	10.8	181.	223.	123.
4/ 8/79	1515	19.9	6.3	10.8	170.	208.	115.
4/ 8/79	1530	19.9	6.7	10.8	164.	206.	114.
4/ 8/79	1545	19.9	6.8	10.7	160.	203.	112.
4/ 8/79	1600	19.9	6.7	10.6	154.	194.	107.
4/ 8/79	1615	19.9	6.6	10.6	152.	191.	105.
4/ 8/79	1630	19.9	6.6	10.7	181.	227.	125.
4/ 8/79	1645	19.9	6.6	10.4	175.	218.	120.
4/ 8/79	1700	19.9	6.7	10.4	175.	221.	122.
4/ 8/79	1715	20.4	6.6	10.5	175.	219.	121.
4/ 8/79	1730	20.4	6.6	10.4	174.	217.	120.
4/ 8/79	1745	20.4	6.6	10.5	171.	214.	118.
4/ 8/79	1800	20.4	6.6	10.5	169.	211.	116.
4/ 8/79	1815	20.8	6.6	10.5	166.	208.	115.
4/ 8/79	1830	20.8	6.6	10.5	166.	207.	114.
4/ 8/79	1845	20.8	6.6	10.5	165.	206.	114.
4/ 8/79	1900	20.8	6.5	10.6	164.	204.	113.
4/ 8/79	1915	21.1	6.5	10.6	177.	221.	122.
4/ 8/79	1930	21.1	6.6	10.6	175.	219.	121.
4/ 8/79	1945	21.1	6.7	10.6	184.	232.	128.
4/ 8/79	2000	21.1	6.4	10.4	184.	228.	126.
4/ 8/79	2015	21.1	6.4	10.5	187.	232.	128.
4/ 8/79	2030	21.1	6.4	10.5	189.	234.	129.
4/ 8/79	2045	21.1	6.3	10.5	189.	232.	128.
4/ 8/79	2100	21.1	6.6	10.4	191.	240.	132.
4/ 8/79	2115	20.5	6.7	10.2	194.	245.	135.
4/ 8/79	2130	20.5	6.8	10.1	196.	250.	138.
4/ 8/79	2145	20.5	6.6	10.1	197.	246.	136.
4/ 8/79	2200	20.5	6.7	10.2	200.	253.	140.
4/ 8/79	2215	20.4	6.8	10.2	202.	257.	142.
4/ 8/79	2230	20.4	6.4	10.0	202.	250.	138.
4/ 8/79	2245	20.4	6.4	10.0	199.	245.	135.
4/ 8/79	2300	20.4	6.3	10.2	199.	244.	134.
4/ 8/79	2315	20.8	6.4	10.3	199.	246.	136.
4/ 8/79	2330	20.8	6.4	10.4	199.	245.	135.
4/ 8/79	2345	20.8	6.3	10.3	200.	244.	135.
4/ 8/79	2400	20.8	6.5	10.3	199.	247.	136.

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**                     15 MIN. DATA                   **
**             DRY STACK GAS CONCENTRATION            **
**                                                    **
**                          O2    CO2    NO    NO    NO   **
**                   LOAD  VOL%   VOL%  PPMV  PPMV  NG/J  **
**   DATE     TIME   MWTH  MEAS   MEAS  MEAS  3%O2        **
********************************************************
** 4/ 9/79      15   20.2   6.1   10.3  201.  244.  134.  **
** 4/ 9/79      30   20.2   6.1   10.1  201.  243.  134.  **
** 4/ 9/79      45   20.2   6.1   10.4  204.  247.  136.  **
** 4/ 9/79     100   20.2   6.1   10.4  204.  248.  137.  **
** 4/ 9/79     115   20.2   6.1   10.4  204.  247.  136.  **
** 4/ 9/79     130   20.2   6.1   10.4  204.  248.  137.  **
** 4/ 9/79     145   20.2   6.1   10.4  204.  248.  137.  **
** 4/ 9/79     200   20.2   6.1   10.4  205.  248.  137.  **
** 4/ 9/79     215   20.1   6.1   10.4  200.  242.  134.  **
** 4/ 9/79     230   20.1   6.1   10.4  200.  242.  134.  **
** 4/ 9/79     245   20.1   6.1   10.4  201.  243.  134.  **
** 4/ 9/79     300   20.1   6.1   10.4  200.  241.  133.  **
** 4/ 9/79     315   20.1   6.1   10.4  197.  239.  132.  **
** 4/ 9/79     330   20.1   6.1   10.4  199.  242.  134.  **
** 4/ 9/79     345   20.1   6.1   10.4  199.  240.  132.  **
** 4/ 9/79     400   20.1   6.0   10.4  197.  236.  130.  **
** 4/ 9/79     415   19.3   6.0   10.4  196.  236.  130.  **
** 4/ 9/79     430   19.3   6.1   10.4  195.  235.  130.  **
** 4/ 9/79     445   19.3   6.1   10.4  195.  236.  130.  **
** 4/ 9/79     500   19.3   6.2   10.4  196.  239.  132.  **
** 4/ 9/79     515   21.1   6.4   10.5  195.  241.  133.  **
** 4/ 9/79     530   21.1   6.1   10.5  195.  236.  130.  **
** 4/ 9/79     545   21.1   6.1   10.2  194.  235.  129.  **
** 4/ 9/79     600   21.1   6.0   10.2  192.  231.  127.  **
** 4/ 9/79     615   21.1   6.2   10.5  192.  234.  129.  **
** 4/ 9/79     630   21.1   6.1   10.5  195.  237.  130.  **
** 4/ 9/79     645   21.1   6.1   10.5  196.  238.  131.  **
** 4/ 9/79     700   21.1   6.1   10.3  196.  236.  130.  **
** 4/ 9/79     715   20.9   6.2   10.4  194.  237.  131.  **
** 4/ 9/79     730   20.9   6.1   10.3  195.  235.  130.  **
** 4/ 9/79     745   20.9   6.1   10.3  192.  233.  129.  **
** 4/ 9/79     800   20.9   6.1   10.3  192.  233.  129.  **
** 4/ 9/79     815   20.8   6.1   10.3  193.  234.  129.  **
** 4/ 9/79     830   20.8   6.2   10.5  194.  237.  131.  **
** 4/ 9/79     845   20.8   6.1   10.2  195.  235.  130.  **
** 4/ 9/79     900   20.8   6.1   10.2  194.  234.  129.  **
** 4/ 9/79     915   20.8   6.1   10.3  195.  235.  130.  **
** 4/ 9/79     930   20.8   6.3   10.3  197.  241.  133.  **
** 4/ 9/79     945   20.8   6.1   10.3  194.  234.  129.  **
** 4/ 9/79    1000   20.8   6.3   10.1  177.  217.  120.  **
** 4/ 9/79    1015   20.9   6.4   10.4  179.  221.  122.  **
** 4/ 9/79    1030   20.9   6.3   10.8  176.  215.  119.  **
** 4/ 9/79    1045   20.9   6.3   10.8  175.  215.  119.  **
** 4/ 9/79    1100   20.9   6.4   10.7  174.  216.  119.  **
** 4/ 9/79    1115   21.1   6.4   10.8  174.  214.  118.  **
** 4/ 9/79    1130   21.1   6.3   10.8  172.  210.  116.  **
** 4/ 9/79    1145   21.1   6.3   10.8  172.  211.  116.  **
** 4/ 9/79    1200   21.1   6.3   10.8  175.  214.  118.  **
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**                                                                           **
**                               15 MIN. DATA                                **
**                        DRY STACK GAS CONCENTRATION                        **
**                                                                           **
**                              O2      CO2      NO       NO       NO        **
**                   LOAD      VOL%     VOL%     PPMV     PPMV     NG/J      **
**  DATE       TIME  MWTH      MEAS     MEAS     MEAS     3%O2               **
*******************************************************************************
** 4/ 9/79     1215  21.1       6.3     10.8     179.     218.     120.      **
** 4/ 9/79     1230  21.1       6.3     10.8     179.     220.     121.      **
** 4/ 9/79     1245  21.1       6.4     10.8     179.     221.     122.      **
** 4/ 9/79     1300  21.1       6.4     10.8     179.     222.     122.      **
** 4/ 9/79     1315  21.1       6.3     10.7     180.     221.     122.      **
** 4/ 9/79     1330  21.1       6.3     10.7     180.     221.     122.      **
** 4/ 9/79     1345  21.1       6.3     10.7     181.     221.     122.      **
** 4/ 9/79     1400  21.1       6.3     10.7     180.     220.     121.      **
** 4/ 9/79     1415  21.1       6.2     10.7     182.     222.     122.      **
** 4/ 9/79     1430  21.1       6.2     10.8     182.     222.     123.      **
** 4/ 9/79     1445  21.1       6.3     10.8     181.     221.     122.      **
** 4/ 9/79     1500  21.1       6.3     10.8     181.     221.     122.      **
** 4/ 9/79     1515  21.1       6.3     10.8     184.     225.     124.      **
** 4/ 9/79     1530  21.1       6.3     10.8     180.     221.     122.      **
** 4/ 9/79     1545  21.1       6.3     10.8     179.     219.     121.      **
** 4/ 9/79     1600  21.1       6.3     10.8     180.     221.     122.      **
** 4/ 9/79     1615  21.5       6.3     10.8     181.     223.     123.      **
** 4/ 9/79     1630  21.5       6.3     10.8     184.     226.     124.      **
** 4/ 9/79     1645  21.5       6.3     10.8     182.     224.     124.      **
** 4/ 9/79     1700  21.5       6.3     10.8     185.     227.     125.      **
** 4/ 9/79     1715  21.5       6.3     10.8     185.     227.     125.      **
** 4/ 9/79     1730  21.5       6.3     10.8     185.     228.     126.      **
** 4/ 9/79     1745  21.5       6.3     10.8     187.     230.     127.      **
** 4/ 9/79     1800  21.5       6.3     10.8     188.     231.     127.      **
** 4/ 9/79     1815  21.5       6.4     10.8     188.     231.     128.      **
** 4/ 9/79     1830  21.5       6.4     10.8     188.     232.     128.      **
** 4/ 9/79     1845  21.5       6.4     10.8     188.     232.     128.      **
** 4/ 9/79     1900  21.5       6.5     10.8     188.     234.     129.      **
** 4/ 9/79     1915  21.1       6.7     10.8     190.     240.     133.      **
** 4/ 9/79     1930  21.1       6.7     10.8     189.     238.     131.      **
** 4/ 9/79     1945  21.1       6.4     10.8     175.     216.     119.      **
** 4/ 9/79     2000  21.1       6.4     10.7     181.     224.     123.      **
** 4/ 9/79     2015  20.9       6.4     10.6     181.     224.     123.      **
** 4/ 9/79     2030  20.9       6.4     10.9     179.     222.     122.      **
** 4/ 9/79     2045  20.9       6.6     10.9     176.     221.     122.      **
** 4/ 9/79     2100  20.9       6.5     10.9     175.     218.     120.      **
** 4/ 9/79     2115  19.9       6.9     10.8     174.     222.     122.      **
** 4/ 9/79     2130  19.9       7.0     10.8     172.     222.     122.      **
** 4/ 9/79     2145  19.9       6.6     10.8     170.     213.     118.      **
** 4/ 9/79     2200  19.9       6.7     10.6     170.     214.     118.      **
** 4/ 9/79     2215  19.9       6.6     10.6     170.     212.     117.      **
** 4/ 9/79     2230  19.9       6.6     10.8     177.     221.     122.      **
** 4/ 9/79     2245  19.9       6.6     10.9     177.     222.     122.      **
** 4/ 9/79     2300  19.9       6.7     10.9     177.     223.     123.      **
** 4/ 9/79     2315  20.2       6.6     10.9     178.     223.     123.      **
** 4/ 9/79     2330  20.2       6.6     10.8     179.     225.     124.      **
** 4/ 9/79     2345  20.2       6.6     10.8     179.     225.     124.      **
** 4/ 9/79     2400  20.2       6.6     10.8     181.     227.     125.      **
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**                         15 MIN. DATA                         **
**               DRY STACK GAS CONCENTRATION                    **
**                                                              **
**                              O2      CO2     NO     NO     NO **
**                     LOAD    VOL%    VOL%   PPMV   PPMV   NG/J **
**    DATE      TIME   MWTH    MEAS    MEAS   MEAS   3%O2        **
******************************************************************
** 4/10/79        15   18.5     6.5    10.8   181.   225.   124.  **
** 4/10/79        30   18.5     6.5    10.8   183.   228.   126.  **
** 4/10/79        45   18.5     6.4    10.8   183.   227.   125.  **
** 4/10/79       100   18.5     6.5    10.8   184.   228.   126.  **
** 4/10/79       115   17.6     6.3    10.9   182.   222.   122.  **
** 4/10/79       130   17.6     6.2    10.9   181.   221.   122.  **
** 4/10/79       145   17.6     6.3    10.9   180.   221.   122.  **
** 4/10/79       200   17.6     6.3    11.0   177.   218.   120.  **
** 4/10/79       215   17.3     6.3    10.9   177.   217.   120.  **
** 4/10/79       230   17.3     6.4    11.0   174.   214.   118.  **
** 4/10/79       245   17.3     6.5    10.9   175.   218.   120.  **
** 4/10/79       300   17.3     6.7    10.9   172.   216.   119.  **
** 4/10/79       315    -.3     6.5    10.8   172.   214.   118.  **
** 4/10/79       330    -.3     6.5    10.8   171.   212.   117.  **
** 4/10/79       345    -.3     6.3    10.9   174.   214.   118.  **
** 4/10/79       400    -.3     6.5    10.9   174.   216.   119.  **
** 4/10/79       415    -.3     6.6    10.9   174.   217.   120.  **
** 4/10/79       430    -.3     6.9    10.9   175.   225.   124.  **
** 4/10/79       445    -.3     6.9    10.4   177.   228.   126.  **
** 4/10/79       500    -.3     7.2    10.4   178.   232.   128.  **
** 4/10/79       515   19.3     7.2    10.5   189.   247.   136.  **
** 4/10/79       530   19.3     7.4    10.7   189.   251.   139.  **
** 4/10/79       545   19.3     7.0    10.5   189.   243.   134.  **
** 4/10/79       600   19.3     7.0    10.3   189.   243.   134.  **
** 4/10/79       615   19.6     6.9    10.5   191.   245.   135.  **
** 4/10/79       630   19.6     6.9    10.5   190.   244.   135.  **
** 4/10/79       645   19.6     7.0    10.6   188.   241.   133.  **
** 4/10/79       700   19.6     6.9    10.7   188.   241.   133.  **
** 4/10/79       715   19.6     6.8    10.6   188.   238.   131.  **
** 4/10/79       730   19.6     6.9    10.6   190.   242.   134.  **
** 4/10/79       745   19.6     6.9    10.8   190.   242.   134.  **
** 4/10/79       800   19.6     6.9    10.8   190.   242.   134.  **
** 4/10/79       815   19.6     6.9    10.7   191.   244.   135.  **
** 4/10/79       830   19.6     6.9    10.7   194.   247.   136.  **
** 4/10/79       845   19.6     6.9    10.7   197.   253.   140.  **
** 4/10/79       900   19.6     6.9    10.7   201.   257.   142.  **
** 4/10/79       915   19.9     7.0    10.7   205.   264.   145.  **
** 4/10/79       930   19.9     6.9    10.7   207.   265.   146.  **
** 4/10/79       945   19.9     6.9    10.7   188.   240.   132.  **
** 4/10/79      1000   19.9     6.9    10.7   182.   233.   128.  **
** 4/10/79      1015   20.1     6.9    10.4   185.   236.   130.  **
** 4/10/79      1030   20.1     6.7    10.2   187.   235.   130.  **
** 4/10/79      1045   20.1     6.7    10.2   184.   233.   129.  **
** 4/10/79      1100   20.1     6.9    10.3   185.   236.   130.  **
** 4/10/79      1115   20.1     6.9    10.3   183.   235.   129.  **
** 4/10/79      1130   20.1     6.5    10.3   180.   224.   123.  **
** 4/10/79      1145   20.1     6.3    10.2   182.   222.   122.  **
** 4/10/79      1200   20.1     6.3    10.4   182.   223.   123.  **
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
4/10/79	1215	20.1	6.3	10.4	181.	221.	122.
4/10/79	1230	20.1	6.2	10.5	181.	221.	122.
4/10/79	1245	20.1	6.2	10.5	182.	222.	122.
4/10/79	1300	20.1	6.2	10.5	180.	220.	121.
4/10/79	1315	19.9	-1.0	10.5	184.	156.	86.
4/10/79	1330	19.9	6.3	10.5	185.	228.	126.
4/10/79	1345	19.9	6.9	10.5	186.	239.	132.
4/10/79	1400	19.9	6.4	10.5	188.	232.	128.
4/10/79	1415	20.1	6.4	10.5	188.	232.	128.
4/10/79	1430	20.1	6.4	10.5	188.	232.	128.
4/10/79	1445	20.1	6.4	10.2	191.	236.	130.
4/10/79	1500	20.1	6.4	10.2	192.	237.	131.
4/10/79	1515	20.1	6.7	10.2	187.	237.	131.
4/10/79	1530	20.1	6.8	10.2	186.	236.	130.
4/10/79	1545	20.1	6.9	10.2	187.	238.	131.
4/10/79	1600	20.1	6.8	10.2	187.	237.	131.
4/10/79	1615	20.1	6.8	10.3	186.	236.	130.
4/10/79	1630	20.1	6.8	10.3	184.	234.	129.
4/10/79	1645	20.1	6.9	10.4	184.	236.	130.
4/10/79	1700	20.1	6.9	10.5	183.	235.	130.
4/10/79	1715	19.3	7.1	10.4	183.	237.	130.
4/10/79	1730	19.3	7.1	10.4	179.	232.	128.
4/10/79	1745	19.3	7.1	10.3	177.	229.	126.
4/10/79	1800	19.3	6.9	10.3	179.	229.	126.
4/10/79	1815	19.3	6.9	10.2	177.	227.	125.
4/10/79	1830	19.3	7.2	10.3	176.	230.	127.
4/10/79	1845	19.3	7.1	10.5	176.	228.	126.
4/10/79	1900	19.3	6.9	10.4	174.	222.	122.
4/10/79	1915	19.8	7.0	10.3	175.	225.	124.
4/10/79	1930	19.8	7.0	10.3	173.	223.	123.
4/10/79	1945	19.8	7.0	10.5	170.	219.	121.
4/10/79	2000	19.8	7.1	10.5	170.	221.	122.
4/10/79	2015	19.6	7.3	10.3	171.	225.	124.
4/10/79	2030	19.6	7.4	10.4	170.	226.	125.
4/10/79	2045	19.6	7.4	10.4	167.	223.	123.
4/10/79	2100	19.6	7.4	10.4	167.	223.	123.
4/10/79	2115	19.3	7.4	10.3	167.	222.	123.
4/10/79	2130	19.3	7.5	10.2	167.	222.	123.
4/10/79	2145	19.3	7.5	10.3	167.	223.	123.
4/10/79	2200	19.3	7.2	10.3	165.	216.	119.
4/10/79	2215	19.5	7.2	10.3	165.	217.	120.
4/10/79	2230	19.5	7.4	10.2	165.	219.	121.
4/10/79	2245	19.5	7.2	10.3	166.	218.	120.
4/10/79	2300	19.5	7.1	10.5	165.	215.	119.
4/10/79	2315	19.6	7.1	10.4	166.	215.	118.
4/10/79	2330	19.6	7.1	10.4	170.	221.	122.
4/10/79	2345	19.6	7.3	10.6	174.	229.	126.
4/10/79	2400	19.6	7.3	10.6	172.	227.	125.

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**************************************************************************
**                           15 MIN, DATA                               **
**                    DRY STACK GAS CONCENTRATION                       **
**                                                                      **
**                              O2      CO2      NO      NO      NO     **
**                     LOAD    VOL%    VOL%     PPMV    PPMV    NG/J    **
**   DATE       TIME   MWTH    MEAS    MEAS     MEAS    3%O2            **
**************************************************************************
** 4/11/79        15   13.2     7.4    10.6     170.    226.    125.    **
** 4/11/79        30   13.2     7.4    10.5     170.    226.    125.    **
** 4/11/79        45   13.2     7.4    10.4     171.    227.    125.    **
** 4/11/79       100   13.2     7.3    10.3     169.    223.    123.    **
** 4/11/79       115   13.8     7.6    10.4     167.    224.    123.    **
** 4/11/79       130   13.8     7.6    10.1     164.    221.    122.    **
** 4/11/79       145   13.8     7.4    10.2     161.    213.    118.    **
** 4/11/79       200   13.8     7.3    10.4     171.    225.    124.    **
** 4/11/79       215   14.6     7.2    10.5     171.    223.    123.    **
** 4/11/79       230   14.6     7.1    10.6     170.    221.    122.    **
** 4/11/79       245   14.6     7.1    10.6     171.    222.    123.    **
** 4/11/79       300   14.6     7.2    10.6     155.    202.    111.    **
** 4/11/79       315   16.4     7.2    10.5     147.    193.    107.    **
** 4/11/79       330   16.4    11.0    10.6      75.    136.     75.    **
** 4/11/79       345   16.4    10.5     7.9     130.    224.    123.    **
** 4/11/79       400   16.4     9.5     7.9     157.    247.    136.    **
** 4/11/79       415   18.8     9.2     8.5     140.    215.    119.    **
** 4/11/79       430   18.8    10.0     8.9     139.    228.    126.    **
** 4/11/79       445   18.8    11.0     8.5     131.    237.    131.    **
** 4/11/79       500   18.8    10.9     7.4     132.    238.    131.    **
** 4/11/79       515   16.4    10.9     7.4     132.    238.    131.    **
** 4/11/79       530   16.4    10.5     7.5     132.    228.    126.    **
** 4/11/79       545   16.4    10.1     7.5     136.    225.    124.    **
** 4/11/79       600   16.4    10.1     8.2     127.    211.    117.    **
** 4/11/79       615   16.1    10.0     8.3     120.    198.    109.    **
** 4/11/79       630   16.1    10.0     8.3     115.    190.    105.    **
** 4/11/79       645   16.1    10.0     8.3     117.    193.    106.    **
** 4/11/79       700   16.1     9.4     8.3     124.    194.    107.    **
** 4/11/79       715   15.8     9.4     8.8     125.    196.    108.    **
** 4/11/79       730   15.8     9.7     8.9     122.    197.    108.    **
** 4/11/79       745   15.8    10.2     8.9     117.    197.    108.    **
** 4/11/79       800   15.8    10.4     8.4     115.    196.    108.    **
** 4/11/79       815   14.4    10.4     8.3     114.    195.    107.    **
** 4/11/79       830   14.4    10.5     8.2     105.    181.    100.    **
** 4/11/79       845   14.4    10.3     8.1     102.    172.     95.    **
** 4/11/79       900   14.4    10.1     8.1     105.    174.     96.    **
** 4/11/79       915   14.4    10.6     8.4     106.    184.    102.    **
** 4/11/79       930   14.4    11.0     8.5     135.    244.    135.    **
** 4/11/79       945   14.4    11.0     7.9     137.    247.    136.    **
** 4/11/79      1000   14.4    10.5     7.6     145.    250.    138.    **
** 4/11/79      1015   13.8     9.8     7.5     148.    239.    132.    **
** 4/11/79      1030   13.8    10.0     7.8     148.    245.    135.    **
** 4/11/79      1045   13.8    10.3     8.3     141.    239.    132.    **
** 4/11/79      1100   13.8    10.2     8.1     143.    241.    133.    **
** 4/11/79      1115   13.8    10.2     7.9     143.    240.    133.    **
** 4/11/79      1130   13.8    10.5     7.8     138.    240.    132.    **
** 4/11/79      1145   13.8    10.6     7.9     135.    234.    129.    **
** 4/11/79      1200   13.8    10.4     7.6     135.    231.    127.    **
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*******************************************************************
**                          15 MIN, DATA                         **
**                   DRY STACK GAS CONCENTRATION                 **
**                                                               **
**                          O2      CO2     NO      NO      NO   **
**                  LOAD    VOL%    VOL%    PPMV    PPMV    NG/J **
**   DATE     TIME  MWTH    MEAS    MEAS    MEAS    3%O2         **
*******************************************************************
** 4/11/79    1215  14.5    10.4     7.6    135.    229.    126. **
** 4/11/79    1230  14.5    10.3     7.6    134.    226.    125. **
** 4/11/79    1245  14.5    10.4     7.6    134.    227.    125. **
** 4/11/79    1300  14.5    10.5     7.5    134.    231.    127. **
** 4/11/79    1315  13.5    10.7     7.6    131.    231.    128. **
** 4/11/79    1330  13.5    10.7     7.5    131.    230.    127. **
** 4/11/79    1345  13.5    10.7     7.4    140.    247.    136. **
** 4/11/79    1400  13.5    11.3     7.7    125.    233.    129. **
** 4/11/79    1415  11.7    11.7     7.7    120.    235.    129. **
** 4/11/79    1430  11.7    11.3     7.0    122.    228.    126. **
** 4/11/79    1445  11.7    11.2     6.9    124.    230.    127. **
** 4/11/79    1500  11.7    12.0     7.0    119.    237.    131. **
** 4/11/79    1515  12.3    11.3     7.0    120.    224.    124. **
** 4/11/79    1530  12.3    10.7     6.7    125.    220.    122. **
** 4/11/79    1545  12.3    10.7     6.8    130.    229.    126. **
** 4/11/79    1600  12.3    11.7     7.5    115.    225.    124. **
** 4/11/79    1615  12.9    11.4     7.1    117.    221.    122. **
** 4/11/79    1630  12.9    11.0     6.6    124.    225.    124. **
** 4/11/79    1645  12.9    11.5     7.1    119.    226.    125. **
** 4/11/79    1700  12.9     9.5     7.2    137.    216.    119. **
** 4/11/79    1715  13.2    10.2     6.9    137.    231.    127. **
** 4/11/79    1730  13.2    10.6     8.1    135.    235.    130. **
** 4/11/79    1745  13.2    10.6     7.7    136.    237.    131. **
** 4/11/79    1800  13.2    10.6     7.6    136.    238.    131. **
** 4/11/79    1815  12.7    10.7     7.6    137.    240.    132. **
** 4/11/79    1830  12.7    10.7     7.6    137.    239.    132. **
** 4/11/79    1845  12.7    10.6     7.6    136.    237.    131. **
** 4/11/79    1900  12.7    10.9     7.6    136.    243.    134. **
** 4/11/79    1915  12.9    11.2     7.6    125.    232.    128. **
** 4/11/79    1930  12.9    10.7     7.5    132.    233.    128. **
** 4/11/79    1945  12.9    10.5     7.3    134.    231.    128. **
** 4/11/79    2000  12.9    11.0     7.6    129.    233.    128. **
** 4/11/79    2015  14.1    10.9     7.7    126.    227.    125. **
** 4/11/79    2030  14.1    10.2     7.4    132.    221.    122. **
** 4/11/79    2045  14.1     9.8     7.5    142.    229.    126. **
** 4/11/79    2100  14.1     9.8     7.9    141.    228.    126. **
** 4/11/79    2115  11.4     9.8     8.4    142.    229.    126. **
** 4/11/79    2130  11.4    13.8     8.4     89.    224.    123. **
** 4/11/79    2145  11.4    11.2     8.4    120.    223.    123. **
** 4/11/79    2200  11.4    10.5     6.9    130.    224.    123. **
** 4/11/79    2215  10.5    10.0     7.0    120.    197.    109. **
** 4/11/79    2230  10.5     9.5     7.7     85.    133.     74. **
** 4/11/79    2245  10.5     9.5     9.1     82.    130.     71. **
** 4/11/79    2300  10.5    10.7     8.3     77.    137.     75. **
** 4/11/79    2315  11.4    10.0     9.6    117.    193.    106. **
** 4/11/79    2330  11.4     9.0     8.9    120.    180.     99. **
** 4/11/79    2345  11.4     9.2     8.5    119.    182.    100. **
** 4/11/79    2400  11.4     9.5     8.9    125.    196.    108. **
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************************************************************************
**                            15 MIN. DATA                            **
**                    DRY STACK GAS CONCENTRATION                     **
**                                                                    **
**                              O2     CO2      NO      NO      NO    **
**                      LOAD    VOL%    VOL%    PPMV    PPMV    NG/J    **
**    DATE     TIME   MWTH    MEAS    MEAS    MEAS    3%O2            **
************************************************************************
** 4/12/79       15   16.4     9.7     9.1    131.    211.    116.    **
** 4/12/79       30   16.4     9.9     9.1    135.    219.    121.    **
** 4/12/79       45   16.4    10.1     9.0    140.    233.    128.    **
** 4/12/79      100   16.4    10.0     8.7    145.    237.    131.    **
** 4/12/79      115   16.3    10.1     8.5    149.    246.    136.    **
** 4/12/79      130   16.3    12.2     8.3    146.    300.    165.    **
** 4/12/79      145   16.3    10.0     8.3    146.    240.    133.    **
** 4/12/79      200   16.3     9.8     8.2    146.    236.    130.    **
** 4/12/79      215   16.3    10.0     8.2    147.    243.    134.    **
** 4/12/79      230   16.3    10.2     8.2    152.    255.    140.    **
** 4/12/79      245   16.3    10.1     8.2    156.    260.    143.    **
** 4/12/79      300   16.3    10.0     8.3    160.    263.    145.    **
** 4/12/79      315   18.3     9.9     8.2    158.    258.    142.    **
** 4/12/79      330   18.3    10.2     8.1    160.    268.    148.    **
** 4/12/79      345   18.3     9.2     8.2    165.    254.    140.    **
** 4/12/79      400   18.3     8.5     8.2    182.    263.    145.    **
** 4/12/79      415   19.3     8.6     8.2    181.    264.    146.    **
** 4/12/79      430   19.3     8.6     8.0    182.    267.    147.    **
** 4/12/79      445   19.3     8.7     8.7    182.    267.    147.    **
** 4/12/79      500   19.3     8.7     9.4    182.    267.    147.    **
** 4/12/79      515   19.0     8.6     9.3    180.    263.    145.    **
** 4/12/79      530   19.0     8.7     9.3    176.    258.    142.    **
** 4/12/79      545   19.0     8.6     9.3    180.    262.    145.    **
** 4/12/79      600   19.0     8.7     9.3    182.    266.    147.    **
** 4/12/79      615   19.0     8.7     9.3    182.    266.    147.    **
** 4/12/79      630   19.0     8.7     9.3    181.    265.    146.    **
** 4/12/79      645   19.0     8.6     9.4    182.    265.    146.    **
** 4/12/79      700   19.0     8.6     9.4    182.    266.    146.    **
** 4/12/79      715   19.6     7.9     9.4    185.    255.    141.    **
** 4/12/79      730   19.6     7.7     9.4    186.    253.    139.    **
** 4/12/79      745   19.6     7.7     9.4    186.    253.    139.    **
** 4/12/79      800   19.6     7.7     9.4    186.    252.    139.    **
** 4/12/79      815   19.3     7.7     9.9    188.    256.    141.    **
** 4/12/79      830   19.3     7.7    10.0    185.    251.    139.    **
** 4/12/79      845   19.3     7.9    10.0    179.    245.    135.    **
** 4/12/79      900   19.3     8.0    10.0    179.    248.    137.    **
** 4/12/79      915   19.3     7.9    10.0    180.    249.    137.    **
** 4/12/79      930   19.3     8.0    10.1    181.    250.    138.    **
** 4/12/79      945   19.3     7.8    10.0    181.    248.    137.    **
** 4/12/79     1000   19.3    10.0    10.0    189.    311.    171.    **
** 4/12/79     1015   19.6     7.6    10.0    188.    251.    139.    **
** 4/12/79     1030   19.6     7.7     9.9    188.    255.    141.    **
** 4/12/79     1045   19.6     7.6    10.0    188.    252.    139.    **
** 4/12/79     1100   19.6     7.5    10.0    189.    252.    139.    **
** 4/12/79     1115   17.6     7.2    10.2    192.    252.    139.    **
** 4/12/79     1130   17.6     7.2    10.1    191.    250.    138.    **
** 4/12/79     1145   17.6     8.4    10.2    188.    269.    148.    **
** 4/12/79     1200   17.6     8.4    10.1    167.    240.    133.    **
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
4/12/79	1215	15.8	8.4	10.3	153.	220.	121.
4/12/79	1230	15.8	8.5	10.3	150.	217.	119.
4/12/79	1245	15.8	8.2	9.6	160.	226.	125.
4/12/79	1300	15.8	7.7	9.3	163.	222.	123.
4/12/79	1315	16.3	7.6	9.2	165.	222.	122.
4/12/79	1330	16.3	7.6	9.2	172.	231.	127.
4/12/79	1345	16.3	7.6	9.6	159.	213.	117.
4/12/79	1400	16.3	7.6	9.8	156.	210.	116.
4/12/79	1415	16.3	7.6	9.9	154.	207.	114.
4/12/79	1430	16.3	7.5	9.9	154.	206.	113.
4/12/79	1445	16.3	7.5	10.0	152.	203.	112.
4/12/79	1500	16.3	7.5	10.0	160.	214.	118.
4/12/79	1515	16.3	7.5	10.0	162.	216.	119.
4/12/79	1530	16.3	7.5	10.0	162.	217.	119.
4/12/79	1545	16.3	7.6	10.0	152.	205.	113.
4/12/79	1600	16.3	7.5	10.0	151.	201.	111.
4/12/79	1615	16.3	7.2	10.0	152.	200.	110.
4/12/79	1630	16.3	7.4	10.0	158.	210.	116.
4/12/79	1645	16.3	7.4	10.0	155.	206.	114.
4/12/79	1700	16.3	7.4	10.0	149.	197.	109.
4/12/79	1715	16.4	7.3	10.0	152.	201.	111.
4/12/79	1730	16.4	7.2	10.0	154.	202.	111.
4/12/79	1745	16.4	7.1	10.0	154.	200.	110.
4/12/79	1800	16.4	7.1	10.0	159.	206.	114.
4/12/79	1815	16.4	7.1	10.0	157.	203.	112.
4/12/79	1830	16.4	7.1	10.0	157.	203.	112.
4/12/79	1845	16.4	7.1	10.1	157.	203.	112.
4/12/79	1900	16.4	7.0	10.1	156.	201.	111.
4/12/79	1915	16.4	7.0	10.1	154.	199.	110.
4/12/79	1930	16.4	7.0	10.1	153.	197.	109.
4/12/79	1945	16.4	7.1	10.1	153.	199.	110.
4/12/79	2000	16.4	7.6	10.1	162.	217.	120.
4/12/79	2015	16.3	7.3	10.1	157.	207.	114.
4/12/79	2030	16.3	7.5	10.1	157.	210.	116.
4/12/79	2045	16.3	7.5	10.2	158.	211.	117.
4/12/79	2100	16.3	7.5	9.8	157.	210.	116.
4/12/79	2115	16.3	7.5	9.9	157.	210.	116.
4/12/79	2130	16.3	7.5	9.9	158.	211.	116.
4/12/79	2145	16.3	7.5	9.9	157.	210.	116.
4/12/79	2200	16.3	7.5	9.8	159.	212.	117.
4/12/79	2215	16.3	7.5	9.8	159.	213.	117.
4/12/79	2230	16.3	7.5	9.8	159.	212.	117.
4/12/79	2245	16.3	7.5	9.8	158.	212.	117.
4/12/79	2300	16.3	7.5	9.9	158.	212.	117.
4/12/79	2315	16.3	7.5	9.9	157.	210.	116.
4/12/79	2330	16.3	7.5	9.9	157.	210.	116.
4/12/79	2345	16.3	7.5	9.9	160.	214.	118.
4/12/79	2400	16.3	7.5	9.9	159.	213.	117.

15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
4/13/79	15	18.5	7.6	9.9	160.	216.	119.
4/13/79	30	18.5	7.6	9.9	161.	216.	119.
4/13/79	45	18.5	7.5	9.9	161.	215.	119.
4/13/79	100	18.5	7.6	9.9	160.	215.	119.
4/13/79	115	18.8	7.6	9.9	159.	214.	118.
4/13/79	130	18.8	7.6	9.9	158.	212.	117.
4/13/79	145	18.8	7.6	9.9	159.	214.	118.
4/13/79	200	18.8	7.6	9.9	159.	214.	118.
4/13/79	215	18.8	7.6	9.9	159.	213.	117.
4/13/79	230	18.8	7.6	9.9	157.	211.	116.
4/13/79	245	18.8	7.6	9.9	157.	211.	117.
4/13/79	300	18.8	7.6	9.9	157.	212.	117.
4/13/79	315	18.8	7.7	9.9	157.	214.	118.
4/13/79	330	18.8	7.9	9.9	165.	228.	126.
4/13/79	345	18.8	7.6	9.9	177.	238.	131.
4/13/79	400	18.8	7.6	9.9	176.	238.	131.
4/13/79	415	19.0	7.6	9.9	175.	237.	130.
4/13/79	430	19.0	7.6	9.8	174.	235.	130.
4/13/79	445	19.0	7.6	9.8	177.	240.	132.
4/13/79	500	19.0	7.9	9.9	181.	249.	137.
4/13/79	515	19.3	7.9	9.9	180.	249.	138.
4/13/79	530	19.3	8.0	9.9	180.	250.	138.
4/13/79	545	19.3	8.0	9.9	179.	249.	137.
4/13/79	600	19.3	7.7	10.0	180.	245.	135.
4/13/79	615	19.8	7.9	10.0	180.	249.	137.
4/13/79	630	19.8	7.9	9.9	180.	247.	136.
4/13/79	645	19.8	7.7	9.9	177.	239.	132.
4/13/79	700	19.8	7.7	9.9	179.	244.	135.
4/13/79	715	19.9	7.7	10.1	177.	240.	132.
4/13/79	730	19.9	7.7	10.0	177.	240.	132.
4/13/79	745	19.9	7.7	10.1	179.	244.	134.
4/13/79	800	19.9	7.7	10.1	181.	245.	135.
4/13/79	815	19.9	7.6	10.2	183.	247.	136.
4/13/79	830	19.9	7.6	10.2	185.	251.	138.
4/13/79	845	19.9	7.6	10.2	187.	252.	139.
4/13/79	900	19.9	7.7	10.2	188.	254.	140.
4/13/79	915	19.8	7.7	10.1	191.	259.	143.
4/13/79	930	19.8	7.6	10.2	182.	246.	135.
4/13/79	945	19.8	7.7	10.2	179.	243.	134.
4/13/79	1000	19.8	7.6	10.2	177.	237.	131.
4/13/79	1015	19.3	7.6	10.2	179.	241.	133.
4/13/79	1030	19.3	13.3	10.2	137.	324.	179.
4/13/79	1045	19.3	13.3	10.2	97.	229.	126.
4/13/79	1100	19.3	13.4	10.1	97.	231.	127.
4/13/79	1115	19.3	13.4	10.1	97.	232.	128.
4/13/79	1130	19.3	13.3	10.1	96.	228.	126.
4/13/79	1145	19.3	7.8	5.9	166.	227.	125.
4/13/79	1200	19.3	7.6	5.8	179.	242.	133.

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*************************************************************************
**                             15 MIN, DATA                            **
**                     DRY STACK GAS CONCENTRATION                     **
**                                                                     **
**                               O2     CO2      NO      NO      NO     **
**                      LOAD    VOL%    VOL%    PPMV    PPMV    NG/J     **
**   DATE       TIME   MWTH    MEAS    MEAS    MEAS    3%O2             **
*************************************************************************
** 4/13/79      1215   19.8     7.7     5.7    177.    241.    133.     **
** 4/13/79      1230   19.8     7.6     5.9    177.    238.    131.     **
** 4/13/79      1245   19.8     7.5     7.9    179.    239.    132.     **
** 4/13/79      1300   19.8     7.5    10.3    179.    240.    132.     **
** 4/13/79      1315   19.9     7.5    10.0    180.    241.    133.     **
** 4/13/79      1330   19.9     7.4     9.9    182.    241.    133.     **
** 4/13/79      1345   19.9     7.5     9.9    183.    244.    135.     **
** 4/13/79      1400   19.9     7.4    10.0    183.    244.    134.     **
** 4/13/79      1415   19.3     7.4    10.0    184.    245.    135.     **
** 4/13/79      1430   19.3     7.4     9.6    183.    244.    134.     **
** 4/13/79      1445   19.3     7.4    10.2    183.    243.    134.     **
** 4/13/79      1500   19.3     7.7    10.1    179.    243.    134.     **
** 4/13/79      1515   19.0     7.7    10.2    178.    242.    133.     **
** 4/13/79      1530   19.0     7.5    10.2    179.    240.    132.     **
** 4/13/79      1545   19.0     7.6    10.2    178.    240.    133.     **
** 4/13/79      1600   19.0     7.4    10.2    179.    238.    131.     **
** 4/13/79      1615   19.3     7.4    10.0    179.    237.    131.     **
** 4/13/79      1630   19.3     7.4    10.0    178.    236.    130.     **
** 4/13/79      1645   19.3     7.4    10.1    177.    236.    130.     **
** 4/13/79      1700   19.3     7.4    10.0    178.    237.    131.     **
** 4/13/79      1715   19.5     7.4    10.2    178.    238.    131.     **
** 4/13/79      1730   19.5     7.4    10.2    179.    238.    131.     **
** 4/13/79      1745   19.5     7.4    10.3    179.    239.    132.     **
** 4/13/79      1800   19.5     7.4    10.3    178.    237.    131.     **
** 4/13/79      1815   19.0     8.0    10.2    175.    243.    134.     **
** 4/13/79      1830   19.0    11.6    10.2    145.    280.    154.     **
** 4/13/79      1845   19.0    11.5    10.2    116.    221.    122.     **
** 4/13/79      1900   19.0    11.5    10.2    116.    221.    122.     **
** 4/13/79      1915   19.2    11.2    10.2    117.    218.    120.     **
** 4/13/79      1930   19.2    11.2    10.2    118.    219.    121.     **
** 4/13/79      1945   19.2    11.2     9.6    120.    223.    123.     **
** 4/13/79      2000   19.2    11.2     6.8    120.    222.    122.     **
** 4/13/79      2015   19.0    11.2     6.8    119.    221.    122.     **
** 4/13/79      2030   19.0    11.2     6.9    119.    221.    122.     **
** 4/13/79      2045   19.0    11.2     6.9    119.    221.    122.     **
** 4/13/79      2100   19.0    11.2     6.9    119.    222.    122.     **
** 4/13/79      2115   18.5    11.2     7.0    119.    220.    121.     **
** 4/13/79      2130   18.5    11.2     6.9    116.    216.    119.     **
** 4/13/79      2145   18.5    11.2     6.9    114.    211.    116.     **
** 4/13/79      2200   18.5    11.2     6.9    114.    211.    116.     **
** 4/13/79      2215   18.5    11.2     6.9    114.    212.    117.     **
** 4/13/79      2230   18.5    11.2     6.9    116.    214.    118.     **
** 4/13/79      2245   18.5    11.2     6.9    115.    213.    117.     **
** 4/13/79      2300   18.5    11.2     6.8    114.    211.    116.     **
** 4/13/79      2315   18.5    11.2     6.9    114.    211.    117.     **
** 4/13/79      2330   18.5    11.2     6.9    114.    211.    116.     **
** 4/13/79      2345   18.5    11.2     6.9    115.    212.    117.     **
** 4/13/79      2400   18.5    11.2     6.9    115.    212.    117.     **
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*****************************************************************
**                        15 MIN. DATA                         **
**                DRY STACK GAS CONCENTRATION                  **
**                                                             **
**                            O2     CO2    NO     NO     NO   **
**                     LOAD   VOL%   VOL%   PPMV   PPMV   NG/J **
**   DATE       TIME   MWTH   MEAS   MEAS   MEAS   3%O2        **
*****************************************************************
** 4/14/79       15    -.3    -1.0     .0    -1.    -1.    -1.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
** 0/ 0/79        0     .0      .0     .0     0.     0.     0.  **
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**                                                                        **
**                          15 MIN. DATA                                  **
**                  DRY STACK GAS CONCENTRATION                           **
**                                                                        **
**                                                                        **
**                                 O2      CO2      NO      NO            **
**                         LOAD   VOL%    VOL%     PPMV    PPMV    NO     **
**   DATE        TIME      MWTH   MEAS    MEAS     MEAS    3%O2   NG/J    **
****************************************************************************
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 0/ 0/79          0       .0     .0      .0       0.      0.     0.     **
** 4/14/79       1745     19.0    7.0    10.1     177.    229.   126.     **
** 4/14/79       1800     19.0    6.8    10.1     178.    226.   125.     **
** 4/14/79       1815     19.0    6.8    10.2     175.    222.   123.     **
** 4/14/79       1830     19.0    6.7    10.1     180.    227.   125.     **
** 4/14/79       1845     19.0    6.6    10.1     184.    231.   128.     **
** 4/14/79       1900     19.0    6.6    10.1     186.    233.   128.     **
** 4/14/79       1915     19.3    6.6    10.1     187.    235.   130.     **
** 4/14/79       1930     19.3    6.6    10.1     195.    243.   134.     **
** 4/14/79       1945     19.3    6.6    10.1     192.    239.   132.     **
** 4/14/79       2000     19.3    6.6    10.1     190.    238.   131.     **
** 4/14/79       2015     19.5    6.6    10.1     189.    236.   130.     **
** 4/14/79       2030     19.5    6.7    10.1     188.    238.   131.     **
** 4/14/79       2045     19.5    6.6    10.1     186.    234.   129.     **
** 4/14/79       2100     19.5    6.5    10.1     184.    228.   126.     **
** 4/14/79       2115     19.3    6.6    10.2     182.    227.   125.     **
** 4/14/79       2130     19.3    6.6    10.1     183.    230.   127.     **
** 4/14/79       2145     19.3    6.6    10.1     185.    231.   127.     **
** 4/14/79       2200     19.3    6.6    10.1     186.    233.   128.     **
** 4/14/79       2215     19.3    6.6    10.1     186.    233.   129.     **
** 4/14/79       2230     19.3    6.6    10.1     188.    235.   130.     **
** 4/14/79       2245     19.3    6.7    10.1     183.    232.   128.     **
** 4/14/79       2300     19.3    6.9    10.1     172.    221.   122.     **
** 4/14/79       2315     19.0    7.0    10.1     169.    218.   120.     **
** 4/14/79       2330     19.0    7.1    10.1     162.    212.   117.     **
** 4/14/79       2345     19.0    7.3    10.0     159.    210.   116.     **
** 4/14/79       2400     19.0    7.2    10.0     159.    208.   115.     **
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
4/15/79	15	18.2	7.2	10.0	159.	207.	114.
4/15/79	30	18.2	7.2	10.0	158.	207.	114.
4/15/79	45	18.2	7.2	9.9	157.	206.	113.
4/15/79	100	18.2	7.2	9.9	156.	204.	113.
4/15/79	115	18.8	7.3	10.0	152.	201.	111.
4/15/79	130	18.8	7.2	9.9	152.	199.	110.
4/15/79	145	18.8	7.1	10.0	152.	198.	109.
4/15/79	200	18.8	7.2	10.0	152.	199.	110.
4/15/79	215	18.9	7.2	9.9	154.	201.	111.
4/15/79	230	18.9	7.2	10.0	154.	201.	111.
4/15/79	245	18.9	7.2	10.0	155.	202.	111.
4/15/79	300	18.9	7.2	10.0	156.	204.	112.
4/15/79	315	19.3	7.2	10.0	155.	202.	111.
4/15/79	330	19.3	7.2	10.0	155.	202.	111.
4/15/79	345	19.3	7.2	10.0	152.	199.	110.
4/15/79	400	19.3	7.2	10.0	152.	199.	110.
4/15/79	415	19.6	7.2	9.9	147.	192.	106.
4/15/79	430	19.6	7.1	10.0	149.	194.	107.
4/15/79	445	19.6	7.1	10.0	149.	193.	106.
4/15/79	500	19.6	7.1	10.0	150.	194.	107.
4/15/79	515	18.8	7.1	10.0	153.	199.	110.
4/15/79	530	18.8	7.1	10.0	155.	200.	110.
4/15/79	545	18.8	7.1	10.0	155.	200.	110.
4/15/79	600	18.8	7.1	10.0	155.	200.	110.
4/15/79	615	18.8	7.1	10.0	155.	200.	110.
4/15/79	630	18.8	7.1	10.0	155.	200.	110.
4/15/79	645	18.8	7.1	9.9	155.	200.	110.
4/15/79	700	18.8	7.1	9.9	155.	201.	111.
4/15/79	715	18.8	7.1	9.9	154.	200.	110.
4/15/79	730	18.8	7.1	9.9	156.	202.	111.
4/15/79	745	18.8	7.1	9.9	156.	202.	111.
4/15/79	800	18.8	7.1	9.9	158.	205.	113.
4/15/79	815	18.9	7.1	10.0	158.	205.	113.
4/15/79	830	18.9	7.0	9.9	160.	206.	114.
4/15/79	845	18.9	7.0	9.9	164.	211.	116.
4/15/79	900	18.9	7.0	10.0	165.	212.	117.
4/15/79	915	18.9	7.0	10.0	167.	216.	119.
4/15/79	930	18.9	7.0	10.0	169.	217.	120.
4/15/79	945	18.9	6.9	9.9	170.	218.	120.
4/15/79	1000	18.9	6.9	9.9	169.	217.	120.
4/15/79	1015	18.8	7.0	10.0	169.	217.	120.
4/15/79	1030	18.8	7.0	10.0	167.	215.	119.
4/15/79	1045	18.8	6.9	9.9	169.	217.	120.
4/15/79	1100	18.8	6.9	9.9	170.	218.	120.
4/15/79	1115	18.8	6.9	10.0	172.	221.	122.
4/15/79	1130	18.8	6.9	10.0	174.	224.	123.
4/15/79	1145	18.8	6.9	10.0	177.	227.	125.
4/15/79	1200	18.8	6.9	10.0	177.	227.	125.

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**                              15 MIN. DATA                             **
**                     DRY STACK GAS CONCENTRATION                       **
**                                                                       **
**                              O2      CO2     NO      NO      NO       **
**                      LOAD    VOL%    VOL%    PPMV    PPMV    NG/J     **
**   DATE       TIME    MWTH    MEAS    MEAS    MEAS    3%O2             **
***************************************************************************
** 4/15/79      1215    19.0     6.9    10.0    172.    221.    122.     **
** 4/15/79      1230    19.0     6.9    10.0    172.    220.    121.     **
** 4/15/79      1245    19.0     7.1    10.0    172.    223.    123.     **
** 4/15/79      1300    19.0     7.3    10.0    177.    234.    129.     **
** 4/15/79      1315    18.8     7.4    10.1    179.    237.    131.     **
** 4/15/79      1330    18.8     7.4    10.0    179.    239.    132.     **
** 4/15/79      1345    18.8     7.5    10.0    175.    234.    129.     **
** 4/15/79      1400    18.8     7.4     9.9    175.    233.    128.     **
** 4/15/79      1415    18.9     7.0     9.9    175.    225.    124.     **
** 4/15/79      1430    18.9     7.2    10.2    179.    234.    129.     **
** 4/15/79      1445    18.9     7.2    10.2    181.    236.    130.     **
** 4/15/79      1500    18.9     7.2    10.2    181.    236.    130.     **
** 4/15/79      1515    19.0     7.2    10.2    180.    235.    129.     **
** 4/15/79      1530    19.0     7.2    10.2    180.    235.    129.     **
** 4/15/79      1545    19.0     7.2    10.2    182.    238.    131.     **
** 4/15/79      1600    19.0     7.2    10.2    183.    240.    132.     **
** 4/15/79      1615    19.0     7.2    10.2    182.    239.    132.     **
** 4/15/79      1630    19.0     7.2    10.2    182.    239.    132.     **
** 4/15/79      1645    19.0     7.3    10.2    180.    236.    130.     **
** 4/15/79      1700    19.0     7.3    10.2    180.    237.    131.     **
** 4/15/79      1715    19.0     7.3    10.2    177.    234.    129.     **
** 4/15/79      1730    19.0     7.4    10.2    175.    231.    127.     **
** 4/15/79      1745    19.0     7.4    10.2    175.    231.    127.     **
** 4/15/79      1800    19.0     7.4    10.2    175.    231.    127.     **
** 4/15/79      1815    19.2     7.3    10.2    175.    230.    127.     **
** 4/15/79      1830    19.2     7.3    10.2    174.    229.    126.     **
** 4/15/79      1845    19.2     7.4    10.2    173.    229.    126.     **
** 4/15/79      1900    19.2     7.4    10.2    174.    230.    127.     **
** 4/15/79      1915    19.5     7.4    10.2    170.    226.    125.     **
** 4/15/79      1930    19.5     7.5    10.2    170.    228.    126.     **
** 4/15/79      1945    19.5     7.6    10.1    169.    227.    125.     **
** 4/15/79      2000    19.5     7.6    10.0    169.    228.    126.     **
** 4/15/79      2015    19.0     7.6    10.0    168.    227.    125.     **
** 4/15/79      2030    19.0     7.6    10.0    167.    225.    124.     **
** 4/15/79      2045    19.0     7.5    10.0    167.    224.    124.     **
** 4/15/79      2100    19.0     7.6    10.0    167.    225.    124.     **
** 4/15/79      2115    19.0     7.5    10.1    167.    224.    123.     **
** 4/15/79      2130    19.0     7.6    10.1    167.    225.    124.     **
** 4/15/79      2145    19.0     7.7    10.1    169.    228.    126.     **
** 4/15/79      2200    19.0     7.7    10.1    170.    230.    127.     **
** 4/15/79      2215    18.8     7.6    10.0    167.    226.    125.     **
** 4/15/79      2230    18.8     7.6    10.0    169.    228.    126.     **
** 4/15/79      2245    18.8     7.5    10.0    167.    224.    123.     **
** 4/15/79      2300    18.8     7.5     9.9    168.    225.    124.     **
** 4/15/79      2315    18.9     7.5    10.1    170.    227.    125.     **
** 4/15/79      2330    18.9     7.6    10.1    169.    228.    125.     **
** 4/15/79      2345    18.9     7.7    10.1    167.    227.    125.     **
** 4/15/79      2400    18.9     7.9    10.0    162.    223.    123.     **
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*********************************************************************
**                         15 MIN. DATA                            **
**                DRY STACK GAS CONCENTRATION                      **
**                                                                 **
**                                                                 **
**                             O2     CO2      NO      NO     NO   **
**                     LOAD   VOL%    VOL%    PPMV    PPMV   NG/J  **
**   DATE      TIME    MWTH   MEAS    MEAS    MEAS    3%O2         **
*********************************************************************
** 4/16/79       15    18.9    7.7     9.9    162.    220.   121.  **
** 4/16/79       30    18.9    7.3     9.9    162.    214.   118.  **
** 4/16/79       45    18.9    7.4    10.2    162.    216.   119.  **
** 4/16/79      100    18.9    7.4    10.3    162.    216.   119.  **
** 4/16/79      115    19.0    7.5    10.2    164.    218.   120.  **
** 4/16/79      130    19.0    7.5    10.1    167.    223.   123.  **
** 4/16/79      145    19.0    7.5    10.1    167.    224.   124.  **
** 4/16/79      200    19.0    7.4    10.2    164.    218.   120.  **
** 4/16/79      215    18.8    7.4    10.1    162.    214.   118.  **
** 4/16/79      230    18.8    7.4    10.2    165.    220.   121.  **
** 4/16/79      245    18.8    7.4    10.1    165.    219.   121.  **
** 4/16/79      300    18.8    7.4    10.1    164.    219.   121.  **
** 4/16/79      315    19.0    7.4    10.1    165.    220.   121.  **
** 4/16/79      330    19.0    7.4    10.1    165.    220.   121.  **
** 4/16/79      345    19.0    7.4    10.1    167.    223.   123.  **
** 4/16/79      400    19.0    7.4    10.1    167.    223.   123.  **
** 4/16/79      415    19.3    7.4    10.1    167.    223.   123.  **
** 4/16/79      430    19.3    7.5    10.1    167.    223.   123.  **
** 4/16/79      445    19.3    7.4    10.3    160.    213.   117.  **
** 4/16/79      500    19.3    7.4    10.0    162.    214.   118.  **
** 4/16/79      515    19.3    7.4    10.3    161.    215.   118.  **
** 4/16/79      530    19.3    7.4    10.2    160.    212.   117.  **
** 4/16/79      545    19.3    7.4    10.2    159.    212.   117.  **
** 4/16/79      600    19.3    7.4    10.2    159.    211.   116.  **
** 4/16/79      615    19.5    7.4    10.2    160.    213.   118.  **
** 4/16/79      630    19.5    7.4    10.2    161.    214.   118.  **
** 4/16/79      645    19.5    7.4    10.2    162.    216.   119.  **
** 4/16/79      700    19.5    7.4    10.2    165.    219.   121.  **
** 4/16/79      715    19.5    7.4    10.2    166.    220.   121.  **
** 4/16/79      730    19.5    7.2    10.2    167.    219.   121.  **
** 4/16/79      745    19.5    7.3    10.2    167.    219.   121.  **
** 4/16/79      800    19.5    7.3    10.2    167.    220.   122.  **
** 4/16/79      815    19.6    7.3    10.2    167.    220.   121.  **
** 4/16/79      830    19.6    7.3    10.2    167.    220.   122.  **
** 4/16/79      845    19.6    7.3    10.2    166.    218.   120.  **
** 4/16/79      900    19.6    7.3    10.2    180.    237.   131.  **
** 4/16/79      915    19.5    7.3    10.2    180.    237.   131.  **
** 4/16/79      930    19.5    7.3    10.2    182.    240.   132.  **
** 4/16/79      945    19.5    7.3    10.2    182.    240.   132.  **
** 4/16/79     1000    19.5    7.3    10.2    182.    240.   132.  **
** 4/16/79     1015    19.6    7.4    10.2    178.    236.   130.  **
** 4/16/79     1030    19.6    7.4    10.2    176.    233.   128.  **
** 4/16/79     1045    19.6    7.4    10.2    175.    232.   128.  **
** 4/16/79     1100    19.6    7.4    10.2    176.    234.   129.  **
** 4/16/79     1115    19.9    7.4    10.2    177.    235.   130.  **
** 4/16/79     1130    19.9    7.4    10.2    181.    239.   132.  **
** 4/16/79     1145    19.9    7.4    10.3    185.    245.   135.  **
** 4/16/79     1200    19.9    7.4    10.2    184.    244.   135.  **
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******************************************************************
**                          15 MIN. DATA                        **
**                 DRY STACK GAS CONCENTRATION                  **
**                                                              **
**                            O2      CO2     NO     NO     NO  **
**                    LOAD   VOL%    VOL%   PPMV   PPMV   NG/J  **
**   DATE     TIME    MWTH   MEAS    MEAS   MEAS   3%O2         **
******************************************************************
** 4/16/79    1215    19.9    7.4    10.2   184.   245.   135.  **
** 4/16/79    1230    19.9    7.4    10.1   184.   245.   135.  **
** 4/16/79    1245    19.9    7.4    10.2   185.   246.   136.  **
** 4/16/79    1300    19.9    7.4    10.1   186.   246.   135.  **
** 4/16/79    1315    19.9    7.4    10.1   185.   245.   135.  **
** 4/16/79    1330    19.9    7.3    10.2   184.   243.   134.  **
** 4/16/79    1345    19.9    7.7     9.9   185.   252.   139.  **
** 4/16/79    1400    19.9    7.6    10.0   185.   249.   137.  **
** 4/16/79    1415    19.9    7.3    10.1   186.   246.   135.  **
** 4/16/79    1430    19.9    7.3    10.2   186.   246.   135.  **
** 4/16/79    1445    19.9    7.3    10.2   186.   245.   135.  **
** 4/16/79    1500    19.9    7.3    10.1   187.   247.   136.  **
** 4/16/79    1515    19.9    7.3    10.1   186.   245.   135.  **
** 4/16/79    1530    19.9    7.3    10.1   186.   245.   135.  **
** 4/16/79    1545    19.9    7.3    10.1   185.   245.   135.  **
** 4/16/79    1600    19.9    7.3    10.1   185.   245.   135.  **
** 4/16/79    1615    19.9    7.3    10.1   187.   247.   136.  **
** 4/16/79    1630    19.9    7.3    10.1   188.   248.   137.  **
** 4/16/79    1645    19.9    7.3    10.1   187.   247.   136.  **
** 4/16/79    1700    19.9    7.3    10.1   184.   242.   134.  **
** 4/16/79    1715    19.8    7.3    10.1   184.   242.   134.  **
** 4/16/79    1730    19.8    7.3    10.1   183.   241.   133.  **
** 4/16/79    1745    19.8    7.3    10.1   182.   241.   133.  **
** 4/16/79    1800    19.8    7.3    10.0   182.   240.   132.  **
** 4/16/79    1815    19.6    7.4    10.0   180.   239.   132.  **
** 4/16/79    1830    19.6    7.4    10.1   180.   239.   132.  **
** 4/16/79    1845    19.6    7.4    10.1   180.   239.   132.  **
** 4/16/79    1900    19.6    7.4    10.1   180.   238.   131.  **
** 4/16/79    1915    19.6    7.4    10.1   180.   240.   132.  **
** 4/16/79    1930    19.6    7.4    10.1   179.   237.   131.  **
** 4/16/79    1945    19.6    7.4    10.1   175.   232.   128.  **
** 4/16/79    2000    19.6    7.6     9.9   173.   233.   129.  **
** 4/16/79    2015    19.0    7.4    10.0   167.   223.   123.  **
** 4/16/79    2030    19.0    7.7     9.9   167.   227.   125.  **
** 4/16/79    2045    19.0    7.7    10.0   165.   223.   123.  **
** 4/16/79    2100    19.0    7.9     9.9   168.   230.   127.  **
** 4/16/79    2115    19.0    7.5     9.9   168.   224.   124.  **
** 4/16/79    2130    19.0    7.6    10.0   167.   224.   123.  **
** 4/16/79    2145    19.0    7.6    10.0   167.   225.   124.  **
** 4/16/79    2200    19.0    7.6    10.0   167.   224.   124.  **
** 4/16/79    2215    19.0    7.7    10.0   168.   228.   126.  **
** 4/16/79    2230    19.0    7.6    10.0   167.   226.   125.  **
** 4/16/79    2245    19.0    7.5    10.1   167.   224.   123.  **
** 4/16/79    2300    19.0    7.5    10.1   165.   220.   122.  **
** 4/16/79    2315    19.0    7.5    10.1   163.   218.   120.  **
** 4/16/79    2330    19.0    7.4    10.1   163.   217.   120.  **
** 4/16/79    2345    19.0    7.6    10.1   163.   219.   121.  **
** 4/16/79    2400    19.0    7.6    10.1   162.   217.   120.  **
******************************************************************
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15 MIN. DATA
DRY STACK GAS CONCENTRATION

DATE	TIME	LOAD MWTH	O2 VOL% MEAS	CO2 VOL% MEAS	NO PPMV MEAS	NO PPMV 3%O2	NO NG/J
4/17/79	15	17.6	7.7	10.0	162.	220.	121.
4/17/79	30	17.6	7.6	10.0	163.	219.	121.
4/17/79	45	17.6	7.6	10.1	162.	218.	120.
4/17/79	100	17.6	7.6	10.1	159.	214.	118.
4/17/79	115	18.5	7.6	10.0	156.	211.	116.
4/17/79	130	18.5	7.6	10.1	157.	210.	116.
4/17/79	145	18.5	7.6	10.1	156.	210.	116.
4/17/79	200	18.5	7.5	10.1	154.	206.	114.
4/17/79	215	18.2	7.6	10.1	153.	206.	114.
4/17/79	230	18.2	7.8	10.0	154.	210.	116.
4/17/79	245	18.2	7.5	10.1	154.	206.	114.
4/17/79	300	18.2	7.4	10.2	154.	205.	113.
4/17/79	315	17.9	7.7	10.1	154.	208.	115.
4/17/79	330	17.9	7.6	10.1	155.	210.	116.
4/17/79	345	17.9	7.6	10.2	155.	208.	115.
4/17/79	400	17.9	7.6	10.2	155.	208.	115.
4/17/79	415	18.8	7.6	10.2	154.	208.	114.
4/17/79	430	18.8	7.7	10.2	150.	204.	113.
4/17/79	445	18.8	7.9	9.9	154.	214.	118.
4/17/79	500	18.8	7.6	10.0	155.	208.	115.
4/17/79	515	18.8	7.8	10.0	153.	210.	116.
4/17/79	530	18.8	7.9	10.0	153.	211.	116.
4/17/79	545	18.8	7.7	10.0	152.	208.	114.
4/17/79	600	18.8	7.7	10.0	151.	206.	114.
4/17/79	615	18.8	7.8	10.0	150.	205.	113.
4/17/79	630	18.8	7.7	10.0	150.	204.	113.
4/17/79	645	18.8	7.5	10.3	152.	204.	113.
4/17/79	700	18.8	7.6	10.2	152.	204.	113.
4/17/79	715	18.5	7.6	10.2	154.	208.	115.
4/17/79	730	18.5	7.6	10.2	155.	208.	115.
4/17/79	745	18.5	7.7	10.2	151.	206.	114.
4/17/79	800	18.5	7.5	10.1	147.	197.	109.
4/17/79	815	17.6	7.4	10.2	147.	196.	108.
4/17/79	830	17.6	7.3	10.3	167.	220.	122.
4/17/79	845	17.6	7.3	10.3	167.	220.	122.
4/17/79	900	17.6	7.2	10.2	167.	218.	120.
4/17/79	915	16.1	7.0	10.3	167.	216.	119.
4/17/79	930	16.1	7.9	10.4	160.	220.	121.
4/17/79	945	16.1	8.1	9.8	160.	225.	124.
4/17/79	1000	16.1	8.4	9.6	160.	230.	127.
4/17/79	1015	16.0	8.6	9.3	159.	231.	127.
4/17/79	1030	16.0	8.7	9.2	157.	231.	127.
4/17/79	1045	16.0	8.7	9.2	157.	231.	127.
4/17/79	1100	16.0	8.6	9.2	157.	229.	126.
4/17/79	1115	16.0	8.5	9.2	157.	228.	125.
4/17/79	1130	16.0	8.5	9.2	157.	227.	125.
4/17/79	1145	16.0	8.5	9.2	157.	227.	125.
4/17/79	1200	16.0	8.5	9.2	157.	227.	125.

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**                        15 MIN. DATA                                     **
**                 DRY STACK GAS CONCENTRATION                             **
**                                                                         **
**                              O2       CO2       NO       NO       NO    **
**                     LOAD    VOL%     VOL%     PPMV     PPMV     NG/J    **
**    DATE     TIME    MWTH    MEAS     MEAS     MEAS     3%O2             **
*****************************************************************************
** 4/17/79     1215    16.0     8.7      9.2     159.     232.     128.    **
** 4/17/79     1230    16.0     8.7      9.1     159.     232.     128.    **
** 4/17/79     1245    16.0     8.6      9.1     159.     231.     128.    **
** 4/17/79     1300    16.0     8.6      9.1     159.     232.     128.    **
** 4/17/79     1315    16.0     8.7      9.1     159.     233.     129.    **
** 4/17/79     1330    16.0     8.7      9.1     159.     233.     129.    **
** 4/17/79     1345    16.0     8.7      9.1     159.     232.     128.    **
** 4/17/79     1400    16.0     8.7      9.1     159.     234.     129.    **
** 4/17/79     1415    15.8     8.6      9.1     159.     233.     128.    **
** 4/17/79     1430    15.8     8.7      9.1     158.     232.     128.    **
** 4/17/79     1445    15.8     8.6      9.1     157.     229.     126.    **
** 4/17/79     1500    15.8     8.7      9.1     157.     230.     127.    **
** 4/17/79     1515    16.3     8.7      9.2     157.     230.     127.    **
** 4/17/79     1530    16.3     7.2      9.6     154.     201.     111.    **
** 4/17/79     1545    16.3     7.1     10.3     153.     199.     110.    **
** 4/17/79     1600    16.3     7.2     10.4     153.     200.     110.    **
** 4/17/79     1615    17.0     7.2     10.3     154.     202.     111.    **
** 4/17/79     1630    17.0     7.0     10.3     166.     214.     118.    **
** 4/17/79     1645    17.0     6.7     10.5     165.     209.     115.    **
** 4/17/79     1700    17.0     6.8     10.6     165.     210.     116.    **
** 4/17/79     1715    17.1     6.9     10.6     166.     211.     116.    **
** 4/17/79     1730    17.1     7.0     10.6     165.     213.     117.    **
** 4/17/79     1745    17.1     6.9     10.5     163.     208.     115.    **
** 4/17/79     1800    17.1     6.9     10.6     164.     210.     116.    **
** 4/17/79     1815    16.1     6.9     10.6     164.     210.     116.    **
** 4/17/79     1830    16.1     7.0     10.6     163.     211.     116.    **
** 4/17/79     1845    16.1     7.1     10.5     165.     213.     118.    **
** 4/17/79     1900    16.1     7.1     10.5     167.     216.     119.    **
** 4/17/79     1915    15.8     7.0     10.5     168.     217.     120.    **
** 4/17/79     1930    15.8     7.1     10.5     171.     221.     122.    **
** 4/17/79     1945    15.8     7.1     10.5     175.     227.     125.    **
** 4/17/79     2000    15.8     6.9     10.5     162.     207.     114.    **
** 4/17/79     2015    17.0     7.3     10.6     174.     229.     126.    **
** 4/17/79     2030    17.0     7.4     10.3     172.     229.     126.    **
** 4/17/79     2045    17.0     7.3     10.3     177.     234.     129.    **
** 4/17/79     2100    17.0     7.3     10.4     177.     233.     129.    **
** 4/17/79     2115    17.0     7.3     10.4     177.     234.     129.    **
** 4/17/79     2130    17.0     7.4     10.4     177.     234.     129.    **
** 4/17/79     2145    17.0     7.4     10.3     175.     231.     127.    **
** 4/17/79     2200    17.0     7.4     10.4     175.     233.     128.    **
** 4/17/79     2215    16.4     7.4     10.4     174.     232.     128.    **
** 4/17/79     2230    16.4     7.4     10.4     176.     233.     129.    **
** 4/17/79     2245    16.4     7.4     10.4     170.     225.     124.    **
** 4/17/79     2300    16.4     7.4     10.4     171.     227.     125.    **
** 4/17/79     2315    16.3     7.5     10.4     166.     222.     122.    **
** 4/17/79     2330    16.3     7.7     10.2     170.     231.     127.    **
** 4/17/79     2345    16.3     7.6     10.2     173.     233.     128.    **
** 4/17/79     2400    16.3     7.7     10.2     170.     230.     127.    **
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**                         15 MIN, DATA                        **
**                 DRY STACK GAS CONCENTRATION                 **
**                                                             **
**                           O2      CO2      NO      NO     NO  **
**                  LOAD    VOL%    VOL%    PPMV    PPMV   NG/J  **
**   DATE     TIME  MWTH    MEAS    MEAS    MEAS    3%O2         **
*****************************************************************
** 4/18/79      15  17.6     7.6    10.2    169.    226.   125.  **
** 4/18/79      30  17.6     7.6    10.2    170.    228.   126.  **
** 4/18/79      45  17.6     7.6    10.2    169.    228.   125.  **
** 4/18/79     100  17.6     7.6    10.2    172.    232.   128.  **
** 4/18/79     115  17.4     7.7    10.3    170.    230.   127.  **
** 4/18/79     130  17.4     7.7    10.3    173.    234.   129.  **
** 4/18/79     145  17.4     7.6    10.2    167.    226.   125.  **
** 4/18/79     200  17.4     7.7    10.2    170.    230.   127.  **
** 4/18/79     215  17.3     7.7    10.2    168.    227.   125.  **
** 4/18/79     230  17.3     7.7    10.2    170.    231.   127.  **
** 4/18/79     245  17.3     7.7    10.2    162.    220.   121.  **
** 4/18/79     300  17.3     7.8    10.1    160.    219.   121.  **
** 4/18/79     315  17.4     7.8    10.1    162.    222.   122.  **
** 4/18/79     330  17.4     7.8    10.1    157.    215.   119.  **
** 4/18/79     345  17.4     7.8    10.1    158.    216.   119.  **
** 4/18/79     400  17.4     7.9    10.1    158.    218.   120.  **
** 4/18/79     415  17.4     7.9    10.1    160.    221.   122.  **
** 4/18/79     430  17.4     7.9    10.0    156.    216.   119.  **
** 4/18/79     445  17.4     7.9    10.0    162.    223.   123.  **
** 4/18/79     500  17.4     7.9    10.0    164.    226.   125.  **
** 4/18/79     515  16.4     7.9    10.0    162.    224.   124.  **
** 4/18/79     530  16.4     7.9    10.0    163.    225.   124.  **
** 4/18/79     545  16.4     7.9    10.0    161.    223.   123.  **
** 4/18/79     600  16.4     7.8    10.0    167.    229.   126.  **
** 4/18/79     615  16.4     7.7    10.1    178.    242.   134.  **
** 4/18/79     630  16.4     7.9    10.3    181.    250.   138.  **
** 4/18/79     645  16.4     7.9    10.3    183.    253.   139.  **
** 4/18/79     700  16.4     7.9    10.4    157.    217.   120.  **
** 4/18/79     715  16.4     7.9    10.4    155.    215.   119   **
** 4/18/79     730  16.4     8.8    10.4    155.    230.   127.  **
** 4/18/79     745  16.4     8.8    10.3    154.    228.   126.  **
** 4/18/79     800  16.4     8.8     9.4    158.    234.   129.  **
** 4/18/79     815  16.4     8.7     9.4    156.    229.   126.  **
** 4/18/79     830  16.4     8.7     9.5    157.    231.   127.  **
** 4/18/79     845  16.4     8.7     9.5    130.    190.   105.  **
** 4/18/79     900  16.4     8.0     9.5    122.    170.    94.  **
** 4/18/79     915  16.4     7.9     9.6    132.    183.   101.  **
** 4/18/79     930  16.4     7.9     9.8    119.    164.    90.  **
** 4/18/79     945  16.4     7.9     9.8    121.    166.    92.  **
** 4/18/79    1000  16.4     7.9     9.9    121.    167.    92.  **
** 4/18/79    1015  16.4     7.8     9.9    120.    164.    90.  **
** 4/18/79    1030  16.4     7.7     9.9    125.    170.    93.  **
** 4/18/79    1045  16.4     7.7     9.9    122.    165.    91.  **
** 4/18/79    1100  16.4     7.7     9.9    121.    164.    91.  **
** 4/18/79    1115  16.7     7.7     9.9    125.    170.    93.  **
** 4/18/79    1130  16.7     7.7     9.9    127.    174.    96.  **
** 4/18/79    1145  16.7     7.7     9.9    125.    170.    94.  **
** 4/18/79    1200  16.7     7.7     9.9    124.    168.    93.  **
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**************************************************************************
**                         15 MIN. DATA                                 **
**                DRY STACK GAS CONCENTRATION                           **
**                                                                      **
**                             O2       CO2      NO      NO      NO     **
**                     LOAD    VOL%     VOL%     PPMV    PPMV    NG/J   **
**   DATE      TIME    MWTH    MEAS     MEAS     MEAS    3%O2           **
**************************************************************************
** 4/18/79     1215    16.7     8.5      9.9     125.    180.     99.   **
** 4/18/79     1230    16.7     8.0     10.0     122.    170.     94.   **
** 4/18/79     1245    16.7     7.3     10.0     122.    161.     89.   **
** 4/18/79     1300    16.7     7.2     10.0     123.    161.     89.   **
** 4/18/79     1315    17.0     7.2     10.0     122.    161.     89.   **
** 4/18/79     1330    17.0     7.4     10.0     123.    163.     90.   **
** 4/18/79     1345    17.0     7.9     10.1     122.    169.     93.   **
** 4/18/79     1400    17.0     7.7     10.1     122.    166.     92.   **
** 4/18/79     1415    17.0     7.2     10.1     121.    159.     88.   **
** 4/18/79     1430    17.0     7.2     10.1     120.    157.     87.   **
** 4/18/79     1445    17.0     7.2     10.1     121.    159.     88.   **
** 4/18/79     1500    17.0     7.5     10.1     122.    164.     90.   **
** 4/18/79     1515    17.0     7.8     10.1     125.    171.     94.   **
** 4/18/79     1530    17.0     7.8     10.0     125.    171.     94.   **
** 4/18/79     1545    17.0     7.7      9.9     124.    169.     93.   **
** 4/18/79     1600    17.0     7.7      9.9     124.    168.     93.   **
** 4/18/79     1615    17.0     7.7      9.9     124.    168.     93.   **
** 4/18/79     1630    17.0     8.0      9.9     125.    173.     96.   **
** 4/18/79     1645    17.0     8.7      9.9     121.    178.     98.   **
** 4/18/79     1700    17.0     8.2      9.9     121.    172.     95.   **
** 4/18/79     1715    17.1     8.1     10.0     121.    169.     93.   **
** 4/18/79     1730    17.1     8.2     10.0     120.    169.     93.   **
** 4/18/79     1745    17.1     6.9     10.0     120.    154.     85.   **
** 4/18/79     1800    17.1    -1.0     10.1      -1.     -1.     -1.   **
** 4/18/79     1815    16.1     7.9     10.1     130.    180.     99.   **
** 4/18/79     1830    16.1     7.9       .0     129.    179.     99.   **
** 4/18/79     1845    16.1     8.5      9.5     130.    187.    103.   **
** 4/18/79     1900    16.1     8.5      9.5     132.    191.    105.   **
** 4/18/79     1915    15.8     8.7      9.5     131.    192.    106.   **
** 4/18/79     1930    15.8     8.2      9.5     120.    169.     93.   **
** 4/18/79     1945    15.8     8.2      9.7     120.    169.     93.   **
** 4/18/79     2000    15.8     8.2      9.7     120.    169.     93.   **
** 4/18/79     2015    17.0     8.2      9.7     119.    168.     93.   **
** 4/18/79     2030    17.0     8.1      9.7     120.    168.     93.   **
** 4/18/79     2045    17.0     8.1      9.7     118.    166.     91.   **
** 4/18/79     2100    17.0     8.2      9.7     118.    166.     92.   **
** 4/18/79     2115    17.0     8.1      9.7     117.    164.     91.   **
** 4/18/79     2130    17.0     8.1      9.7     116.    162.     89.   **
** 4/18/79     2145    17.0     8.1      9.7     115.    161.     89.   **
** 4/18/79     2200    17.0     8.1      9.7     115.    161.     89.   **
** 4/18/79     2215    16.4     8.0      9.8     114.    159.     88.   **
** 4/18/79     2230    16.4     8.0      9.8     123.    171.     94.   **
** 4/18/79     2245    16.4     8.0      9.8     123.    171.     94.   **
** 4/18/79     2300    16.4     8.1      9.6     122.    172.     95.   **
** 4/18/79     2315    16.3     8.2      9.6     123.    173.     96.   **
** 4/18/79     2330    16.3     8.2      9.6     124.    175.     96.   **
** 4/18/79     2345    16.3     8.2      9.5     123.    173.     96.   **
** 4/18/79     2400    16.3     8.2      9.5     123.    174.     96.   **
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**                                                                          
**                         15 MIN, DATA                                   **
**                  DRY STACK GAS CONCENTRATION                           **
**                                                                        **
**                               O2      CO2      NO      NO      NO      **
**                       LOAD    VOL%    VOL%     PPMV    PPMV    NG/J    **
**     DATE      TIME    MWTH    MEAS    MEAS     MEAS    3%O2            **
*****************************************************************************
** 4/19/79         15    17.6     8.2     9.5     123.    173.     95.    **
** 4/19/79         30    17.6     8.2     9.5     123.    173.     95.    **
** 4/19/79         45    17.6     8.1     9.5     122.    172.     95.    **
** 4/19/79        100    17.6     8.1     9.5     122.    172.     95.    **
** 4/19/79        115    17.4     8.1     9.5     122.    172.     95.    **
** 4/19/79        130    17.4     8.1     9.5     121.    169.     93.    **
** 4/19/79        145    17.4     8.1     9.5     121.    169.     93.    **
** 4/19/79        200    17.4     8.2     9.5     122.    173.     96.    **
** 4/19/79        215    17.3     8.4     9.5     126.    180.     99.    **
** 4/19/79        230    17.3     8.4     9.4     129.    184.    101.    **
** 4/19/79        245    17.3     8.3     9.3     130.    185.    102.    **
** 4/19/79        300    17.3     8.3     9.3     130.    185.    102.    **
** 4/19/79        315    17.4     8.2     9.4      78.    111.     61.    **
** 4/19/79        330    17.4     8.2     9.4      79.    112.     62.    **
** 4/19/79        345    17.4     8.2     9.4      79.    112.     62.    **
** 4/19/79        400    17.4     8.2     9.4      79.    112.     62.    **
** 4/19/79        415    17.4     8.3     9.4     122.    174.     96.    **
** 4/19/79        430    17.4     8.3     9.4     127.    180.     99.    **
** 4/19/79        445    17.4     8.1     9.3     125.    175.     97.    **
** 4/19/79        500    17.4     8.0     9.4     125.    173.     96.    **
** 4/19/79        515    16.4     8.0     9.5     124.    173.     95.    **
** 4/19/79        530    16.4     8.0     9.6     125.    174.     96.    **
** 4/19/79        545    16.4     8.0     9.6     125.    174.     96.    **
** 4/19/79        600    16.4     8.0     9.5     125.    174.     96.    **
** 4/19/79        615    16.4     8.0     9.6     126.    174.     96.    **
** 4/19/79        630    16.4     7.9     9.6     125.    173.     95.    **
** 4/19/79        645    16.4     7.9     9.6     126.    174.     96.    **
** 4/19/79        700    16.4     7.9     9.6     127.    175.     97.    **
** 4/19/79        715    16.4     7.9     9.7     126.    174.     96.    **
** 4/19/79        730    16.4     7.8     9.7     126.    173.     95.    **
** 4/19/79        745    16.4     7.7     9.7     126.    172.     95.    **
** 4/19/79        800    16.4     7.7     9.7     125.    171.     94.    **
** 4/19/79        815    16.4     8.2     9.7     134.    189.    104.    **
** 4/19/79        830    16.4     8.2     9.7     128.    181.    100.    **
** 4/19/79        845    16.4     8.3     9.4     129.    184.    101.    **
** 4/19/79        900    16.4     8.0     9.4     130.    180.     99.    **
** 4/19/79        915    16.0     7.8     9.4     122.    167.     92.    **
** 4/19/79        930    16.0     7.8     9.4     119.    162.     89.    **
** 4/19/79        945    16.0     7.8     9.9     116.    159.     88.    **
** 4/19/79       1000    16.0     7.8     9.8     116.    159.     88.    **
** 4/19/79       1015    16.4     7.7     9.9     115.    156.     86.    **
** 4/19/79       1030    16.4     7.7     9.9     114.    156.     86.    **
** 4/19/79       1045    16.4     7.7      .0     119.    161.     89.    **
** 4/19/79       1100    16.4     7.7     9.9     118.    160.     88.    **
** 4/19/79       1115    16.7     7.7    10.0     116.    157.     87.    **
** 4/19/79       1130    16.7     7.6    10.0     117.    157.     87.    **
** 4/19/79       1145    16.7     7.6      .0     118.    159.     88.    **
** 4/19/79       1200    16.7     7.7    10.0     118.    161.     89.    **
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**                         15 MIN, DATA                               **
**                 DRY STACK GAS CONCENTRATION                        **
**                                                                    **
**                                 O2      CO2      NO      NO        **
**                        LOAD    VOL%     VOL%    PPMV    PPMV    NO **
**   DATE         TIME    MWTH    MEAS     MEAS    MEAS    3%O2  NG/J **
************************************************************************
** 4/19/79        1215    16.7     7.8     10.0    121.    166.   91. **
** 4/19/79        1230    16.7     7.8     10.0    121.    165.   91. **
** 4/19/79        1245    16.7     7.7       .0    118.    161.   89. **
** 4/19/79        1300    16.7     7.7      9.9    119.    162.   89. **
** 4/19/79        1315    16.8     7.7      9.9    118.    160.   88. **
** 4/19/79        1330    16.8     7.7      9.9    119.    162.   89. **
** 4/19/79        1345    16.8    -1.0      9.9    119.    101.   55. **
** 4/19/79        1400    16.8    -1.0     10.0    147.    124.   69. **
** 4/19/79        1415    16.6    11.2       .0    105.    195.  107. **
** 4/19/79        1430    16.6    -1.0       .0     -1.     -1.   -1. **
** 4/19/79        1445    16.6    12.4       .0     -1.     -1.   -1. **
** 4/19/79        1500    16.6    12.4      9.2    124.    262.  145. **
** 4/19/79        1515    16.4    12.5     12.0    124.    265.  146. **
** 4/19/79        1530    16.4    12.7       .0    123.    268.  148. **
** 4/19/79        1545    16.4    12.8      9.7    125.    277.  153. **
** 4/19/79        1600    16.4    12.9      9.7    127.    285.  157. **
** 4/19/79        1615    16.4    12.5      9.7    128.    272.  150. **
** 4/19/79        1630    16.4    12.5      9.7    127.    270.  149. **
** 4/19/79        1645    16.4    12.3       .0    124.    259.  143. **
** 4/19/79        1700    16.4    12.0      9.6    123.    248.  137. **
** 4/19/79        1715    16.4    12.0      9.7    122.    246.  136. **
** 4/19/79        1730    16.4    12.0      9.7    119.    240.  133. **
** 4/19/79        1745    16.4    12.0       .0    121.    244.  135. **
** 4/19/79        1800    16.4    12.0      9.7    119.    240.  133. **
** 4/19/79        1815    16.4    11.7      9.7    120.    235.  129. **
** 4/19/79        1830    16.4    11.7      9.7    119.    234.  129. **
** 4/19/79        1845    16.4    11.5       .0    115.    219.  121. **
** 4/19/79        1900    16.4    12.5      9.7    122.    260.  143. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
** 0/ 0/79           0      .0      .0       .0      0.      0.    0. **
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